

**UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK**

ISABEL LITOVICH, MICHAEL V.
COTTRELL, FRANK HIRSCH,
HOLDCRAFT MARITAL TRUST, and
UNITED FOOD AND COMMERCIAL
WORKERS UNION AND PARTICIPATING
FOOD INDUSTRY EMPLOYERS TRI-
STATE PENSION FUND, on Behalf of
Themselves and All Others Similarly Situated,

Plaintiffs,

v.

BANK OF AMERICA CORPORATION;
MERRILL LYNCH, PIERCE, FENNER &
SMITH, INC.; BofA SECURITIES, INC.;
BARCLAYS CAPITAL INC.; CITIGROUP
INC.; CITIGROUP GLOBAL MARKETS
INC.; CREDIT SUISSE SECURITIES (USA)
LLC; DEUTSCHE BANK SECURITIES
INC.; THE GOLDMAN SACHS GROUP,
INC.; GOLDMAN, SACHS & CO., LLC;
JPMORGAN CHASE & CO.; J.P. MORGAN
SECURITIES LLC; MORGAN STANLEY;
MORGAN STANLEY & CO., LLC;
MORGAN STANLEY SMITH BARNEY
LLC; NATWEST MARKETS SECURITIES
INC.; WELLS FARGO & CO.; WELLS
FARGO SECURITIES LLC; and WELLS
FARGO CLEARING SERVICES, LLC,

Defendants.

Case No. 1:20-cv-03154 (VEC)

SECOND AMENDED CONSOLIDATED CLASS ACTION COMPLAINT

TABLE OF CONTENTS

INTRODUCTION	1
JURISDICTION AND VENUE	5
PARTIES	6
AGENTS AND CO-CONSPIRATORS	16
FACTUAL ALLEGATIONS	16
I. CORPORATE BONDS	16
A. Basics of Corporate Bonds.....	16
B. OTC Trading in the Secondary Market Is Highly Concentrated	18
C. OTC Trading of Corporate Bonds Inhibits Pricing Transparency	20
II. ECONOMIC EVIDENCE DEMONSTRATES DEFENDANTS’ CONSPIRACY TO CHARGE SUPRA COMPETITIVE PRICES FOR ODD-LOTS BONDS VERSUS ROUND LOT BONDS	26
A. Peer-Reviewed Econometric Research Shows that Dealers Consistently Charge Investors Higher Bid-Offer Spreads for Odd-Lots than Round Lot	26
B. No Legitimate Economic Justification Supports the Substantial Differences in Spreads Between Odd-Lots and Round Lots	31
1. Economic Theory Predicts Spreads Should Widen as Trade Size Increases.....	31
2. Foreign Odd-Lot Bond Trading Demonstrates that the Adverse Pricing of Bond Odd-Lots Is Not Explained by Limitations in Liquidity.....	35
3. Historical Evidence in the U.S. Demonstrates Odd-Lots of Bonds Did Not Trade at Adverse Prices Compared to Round Lots	39
C. Plaintiffs’ Expert Analysis Confirms that Defendants Charge Higher Transaction Costs to Odd-Lots Investors than Round Lot Investors	41
1. The RPT Analysis Shows That Dealers Charged Wider Spreads for Odd-Lots vs. Round Lots.....	41
2. RPT Analysis Shows that Spreads for Odd-Lot Trades Are Wider Than Round Lots Regardless of RPT Type	46
3. Defendants Charged Average Wider Spreads for Odd-Lots vs. Round Lots	47
4. RPT Analysis Shows that Spreads for Odd-Lot Trades Are Wider than Round Lots Regardless of RPT Type	70

5.	Each Defendant Obtained Significantly Lower Execution Prices for Customer-Initiated Sales of Odd-Lots vs. Round Lots	71
6.	Economic Analysis of a Sample of Plaintiffs' Trades Demonstrates Defendants Consistently Charged Plaintiffs Higher Transaction Costs for Odd-Lots Trades.....	74
III.	DEFENDANTS ENGAGED IN A PATTERN OF COLLUSIVE CONDUCT TO RESTRICT COMPETITION FROM ELECTRONIC PLATFORMS THAT SOUGHT TO IMPROVE PRICING FOR ODD-LOT BOND INVESTORS	76
A.	Defendants' Pattern of Punishing Dealers Who Might Engage in Competitive Trading Activity	79
B.	Dealers Shut Down the InterVest Trading System	80
C.	Defendants' Joint Ownership of TradeWeb Allowed Them to Stifle Competition from Electronic Platforms that Threatened to Improve Odd-Lot Pricing.....	81
D.	Defendants' Group Boycott and Collusive Effort to Deny and/or Delay ABS/NYSE Bonds from Gaining Access to Bloomberg's Trade Order Management System	86
E.	Defendants' Refusal to Participate with Bonds.com	89
F.	Defendants Abused Their Board Positions on BondDesk to Remove Leadership that Had Pursued Offering Odd-Lot Investors Better Pricing Transparency	91
G.	Defendants Use TradeWeb (Which They Owned) to Acquire BondDesk and Permanently Foreclose BondDesk as a Retail-Focused Platform.....	93
H.	Other Retail Focused Electronic Platforms for Trading Bonds Failed Due to Defendants' Resistance	96
IV.	PLUS FACTORS DEMONSTRATE DEFENDANTS' CONDUCT CANNOT BE EXPLAINED AWAY AS MERE PARALLEL CONDUCT	98
A.	Defendants' Action Are Against Their Unilateral Self-Interest in the Absence of an Agreement	99
1.	Peer-Reviewed Research Demonstrates Actions Against Unilateral Self-Interest in the Absence of an Agreement	99
2.	Analysis of Riskless Principal Trades Demonstrates Actions Against Unilateral Self-Interest in the Absence of an Agreement	99
3.	Defendants' Adverse Pricing for Odd-Lots Demonstrates Actions Against Unilateral Self-Interest in the Absence of an Agreement	100

4.	Absent Collusion, Defendants’ Failure to Support the Development of All-to-All Trading Was Against Their Unilateral Self-Interest.....	101
B.	Common Motive to Conspire.....	102
C.	The Market Is Highly Concentrated	103
D.	There Are High Levels of Interfirm Communication Between Defendants	103
V.	DEFENDANTS ARE ALLEGED TO HAVE ENGAGED IN SUBSTANTIALLY SIMILAR CONDUCT IN OTHER TRADING MARKETS TO RESTRAIN THE EVOLUTION FROM OTC TRADING TO ELECTRONIC TRADING, INCLUDING EXCHANGES.....	104
A.	Credit Default Swaps	104
B.	Interest Rate Swaps.....	105
C.	Stock Loan Market.....	107
VI.	Other Section 1 Violations Show Defendants’ Callous Indifference Toward the Antitrust Laws	108
A.	LIBOR/Euribor/Yen LIBOR/Swiss Franc LIBOR.....	108
B.	Foreign Currency Exchange Spot Market.....	109
C.	ISDAfix.....	110
D.	Mexican Government Bonds	110
E.	GSE Bonds.....	111
F.	Precious Metals	111
VII.	RELEVANT MARKET DEFINITION	112
VIII.	IMPACT OF DEFENDANTS’ CONDUCT ON THE RELEVANT MARKET AND INVESTORS.....	113
	ANTITRUST INJURY	114
	FRAUDULENT CONCEALMENT.....	114
	CLASS ACTION ALLEGATIONS	119
	CLAIM FOR RELIEF	121
	REQUEST FOR RELIEF	123
	JURY TRIAL DEMAND	124

Plaintiffs Isabel Litovich, Michael V. Cottrell, Frank Hirsch, Holdcraft Marital Trust, and United Food and Commercial Workers Union and Participating Food Industry Employers Tri-State Pension Fund, individually and on behalf of all others similarly situated (“Plaintiffs” or the “Class”), bring this consolidated class action complaint against Defendants Bank of America Corporation; Merrill Lynch, Pierce, Fenner & Smith, Inc.; BofA Securities, Inc.; Barclays Capital Inc.; Citigroup Inc.; Citigroup Global Markets Inc.; Credit Suisse Securities (USA) LLC; Deutsche Bank Securities Inc.; The Goldman Sachs Group, Inc.; Goldman, Sachs & Co., LLC; JPMorgan Chase & Co.; J.P. Morgan Securities LLC; Morgan Stanley; Morgan Stanley & Co., LLC; Morgan Stanley Smith Barney LLC; NatWest Markets Securities Inc.; Wells Fargo & Co.; Wells Fargo Securities LLC; and Wells Fargo Clearing Services, LLC for damages and injunctive relief pursuant to Section 1 of the Sherman Act, 15 U.S.C. §1; and Sections 4 and 16 of the Clayton Act, 15 U.S.C. §§15 and 26.

INTRODUCTION

1. History demonstrates that when trading markets, through innovation and competitive forces, evolve from traditional voice-based, bilateral over-the-counter (“OTC”) markets to electronic all-to-all trading, trading volume increases exponentially while transactional costs per trade paid by investors plummet. Investors benefit from the lower transaction costs brought about by a market structure with more transparent pricing and trading efficiencies. Dealers, however, see their profits per trade diminish as they are forced to be more transparent (and therefore competitive) with their pricing. Faced with an evolution in their trading markets, dealers must adapt to the new competitive landscape or risk being left behind. Unfortunately, dealers can also choose to unlawfully band together to restrain marketplace innovation, thwarting price competition and increasing trading costs. In this case, the dealers chose the latter.

2. Beginning at least as early as August 1, 2006 and continuing to the present (the “Class Period”), Defendants conspired to restrain all-to-all electronic trading of odd-lots of corporate bonds via a group boycott. Defendants are the major dealers of corporate bonds. They are horizontal competitors. Plaintiffs and the “Class” of other similarly situated investors they seek to represent are Defendants’ customers, trading odd-lots of corporate bonds directly with Defendants. As a result of Defendants’ conspiracy, Plaintiffs and the Class paid more when buying, and received less when selling, their corporate bonds, suffering antitrust injury under Section 1 of the Sherman Act, 15 U.S.C. §1.¹

3. The U.S. corporate bond market is among the world’s largest and deepest sources of business capital. Companies issue and sell new bonds to one or more registered securities firms (“dealers”) in the primary market. Once issued, the bonds trade in the secondary market.

4. Because the secondary market for corporate bonds is an OTC market, investors do not receive the same pre-trade pricing transparency available in other all-to-all financial markets, such as equities. In equities, the current best buying (“bid”) and selling (“offer”) prices are publicly available in real time, fostering price competition and greater liquidity. In stark contrast, the corporate bond market’s pricing is opaque. A dealer discloses only its own bid or offer price. An investor must shop that price around to know whether it is the best price in the market.

5. Corporate bond trades are also categorized based on the lot size (the number of bonds included) of the trade. “Round lots” consist of any trade involving increments of 1,000 bonds, or that is greater than and divisible by \$1 million in par value. “Odd-lots” generally consist

¹ Throughout this complaint, the term “bond” is used. Unless the context demonstrates otherwise, the use of the word “bond” should be read to specifically mean “corporate bonds” as opposed to other types of bonds, such as U.S. Treasuries, municipal bonds, government-sponsored enterprise (“GSE”) bonds, SSAs, European bonds, Mexican bonds, etc.

of bond trades involving less than 1,000 bonds, or less than \$1 million in par value. Because bonds from the same issue are fungible, odd-lots of that issue can be combined into a round lot, and, conversely, a round lot of a given issue can be broken into odd-lots. Defendants are dealers for both round lots and odd-lots of corporate bonds.

6. Defendants generally provide either a bid price at which they are willing to purchase bonds or an offer price at which they are willing to sell bonds. The difference between the bid price and the offer price is known as the “bid-offer spread” or the “spread.” As dealers, Defendants prefer wider spreads. Defendants wish to buy bonds (at the bid) from Plaintiffs and the Class at the lowest price possible and sell bonds (at the offer) to Plaintiffs and the Class at the highest price possible. Defendants capture the bid-offer spread (the spread) as compensation for their dealing activities, and wider spreads increase Defendants’ ability to make profits.

7. In contrast, spreads are a transaction cost for Plaintiffs and the Class. Plaintiffs and the Class prefer narrower spreads. Plaintiffs and the Class want to buy at the lowest price available and sell at the highest price available, increasing their ability to make profits when trading bonds.

8. In the secondary market for corporate bonds, odd-lot trades comprise the vast majority of all trades by number of trades. For example, in 2017, 2018, and 2019, approximately 90% of corporate bond trades were less than \$1 million in size. Corporate bond trades of less than \$100,000, a subset of odd-lots which are sometimes referred as “micro lots,” comprise approximately 70% of all trades by number of trades.

9. Defendants charged substantially wider spreads for odd-lots than round lots. No fewer than 11 different peer-reviewed econometric studies by academics have demonstrated that odd-lots investors pay spreads that are 25% to 300% higher than investors trading in round lots of

the same issue. These same studies find no reasonable economic justification to explain the magnitude of the pricing disparity between odd-lot and round lot trades of the same issue.

10. Plaintiffs' experts conducted their own analysis of corporate bond trading. Like the 11 academic studies, their analysis confirmed that each Defendant charged investors, like Plaintiffs, substantially wider spreads for odd-lots than round lots, again without apparent economic justification.

11. The substantial differences between odd-lot and round lot spreads do not exist in foreign bond markets where trading occurs on all-to-all electronic platforms. Though foreign bond markets have lower volumes and less liquidity than the U.S., odd-lots and round lots in foreign markets are traded at similar spreads. And spreads across all sizes in foreign markets are substantially narrower than U.S. spreads for round lots trades.

12. The differences in spreads also did not exist in the United States when bonds were traded on the New York Stock Exchange ("NYSE"), *i.e.*, all-to-all on an exchange. "In the 1940s, despite fixed commissions, costs for retail investors trading corporate bonds were as low or lower than they are today in OTC markets."² Moreover, "the relationship between trading costs and trade size is much flatter in the historical exchange data than in the modern samples. . . . [w]hat is most puzzling, in our view, is that costs in the modern data are as high as they are relative to the historical costs."

13. The reason the U.S. corporate bond market has substantial differences between odd-lot and round lot spreads is no accident of competitive forces. Defendants conspired to consistently shut down innovations in bond trading that would increase pre-trade pricing transparency for

² Bruno Biais and Richard C. Green, *The Microstructure of the Bond Market in the 20th Century*, at 5 (2007).

investors dealing in odd-lots, and odd-lot-focused electronic trading platforms that would have afforded access to investors whose trading would have lessened the spread disparity between odd-lot transactions and round lot transactions. Tellingly, a report by Greenwich Associates LLC based on interviews with Defendants specifically noted that “the top five dealers by market share saw the current e-trading evolution as more of a threat than an opportunity. . . .”

14. Defendants’ efforts to restrain the market to prevent all-to-all trading of odd-lots has been very successful. Bloomberg noted that in U.S. corporate bond trading “[t]here aren’t any exchanges and everything is negotiated, which gives dealers the upper hand when it comes to where the market is for a given bond . . . enabling the biggest firms, like JPMorgan and Goldman Sachs, to keep a stranglehold on the market. . . . The bond market is littered with startups that have tried – and failed – to loosen Wall Street’s grip on bond trading and make it more efficient.”³

JURISDICTION AND VENUE

15. The Court has subject matter jurisdiction over Sherman Act claims pursuant to 28 U.S.C. §§1331 and 1337 and Sections 4 and 16 of the Clayton Act, 15 U.S.C. §§15 and 26.

16. The Court has personal jurisdiction over Defendants subject to service under Section 12 of the Clayton Act, 15 U.S.C. §22. Defendants’ collusive acts took place, in substantial part, in New York specifically and in the United States generally. These acts were conducted by persons and entities subject to the laws of the United States, including New York, as well as other states and territories.

17. Venue is proper in this District pursuant to Sections 4, 12, and 16 of the Clayton Antitrust Act, 15 U.S.C. §§15, 22, and 26, and 28 U.S.C. §1391(b), (c), and (d). One or more

³ Nick Baker and Matthew Leising, *Ex-Goldman Exec Pushes ‘70s Fix for Bond Market’s Big Problem*, BLOOMBERG (June 25, 2018), <https://www.bloomberg.com/news/articles/2018-06-25/ex-goldman-exec-touts-70s-era-fix-to-bond-market-s-big-problem>.

Defendant resides, transacts business, is found, or has agents in this District, a substantial part of the events giving rise to Plaintiffs' claims arose in this District, and a substantial portion of the affected interstate trade and commerce described herein has been carried out in this District.

18. Defendants' acts were within the flow of, were intended to, and did, in fact, have a substantial effect on the interstate commerce of the United States.

PARTIES

19. Plaintiff Isabel Litovich is a citizen of San Juan, Puerto Rico. Plaintiff Litovich held a client account with Defendant Morgan Stanley in which she traded odd-lots of corporate bonds (including, specifically, bonds issued by Harrahs Operating Co. Inc., CUSIP 413627BM1, purchased on March 25, 2013) during the Class Period directly with one or more Defendant (specifically Morgan Stanley), and suffered economic injury in the form of supra-competitive pricing due to Defendants' conspiracy.

20. Plaintiff Michael V. Cottrell is a citizen of the state of Maryland. Plaintiff Cottrell held a client retirement account with Fidelity in which he held odd-lots of corporate bonds that he had traded during the Class Period directly with one or more Defendant, and suffered economic injury in the form of supra-competitive pricing due to Defendants' conspiracy. These bonds included, but were not limited to, bonds issued by: Goldman Sachs Group, Inc., CUSIP 38150AA39, purchased on June 15, 2018; Ford Motor Credit Company, CUSIP 34540TTE2, purchased June 18, 2018; Caterpillar Financial Corp., CUSIP 14912HUN8, purchased June 18, 2018; Philip Morris International, Inc., CUSIP 718172BZ1, purchased on December 20, 2018; Medtronic Inc., CUSIP 585055AX4, purchased on December 20, 2018; GlaxoSmithKline Capital PLC, CUSIP 377373AE5, purchased on December 20, 2018; Gilead Sciences Inc., CUSIP 375558BB8, purchased on December 20, 2018; John Deere Capital Corp., CUSIP 24422ETF6, purchased December 20, 2018; Burlington Northern Santa Fe, CUSIP 12189LAH4, purchased

December 20, 2018; Altria Group Inc., CUSIP 02209SAT0, purchased December 20, 2018; JPMorgan Chase & Co., CUSIP 46625HJE1, purchased May 13, 2019; Charles Schwab Corp., CUSIP 808513AT2, purchased May 13, 2019; Apple Inc., CUSIP 037833CG3, purchased May 13, 2019; and Potomac Electric Power Co., CUSIP 737679DG2, purchased August 13, 2019.

21. Plaintiff Frank Hirsch is a citizen of Deerfield, Illinois. Plaintiff Hirsch held two accounts (an SEP IRA and an account for the Frank Hirsch Family Trust) with Charles Schwab in which he and/or his financial advisor acting on his behalf traded odd-lots of corporate bonds during the Class Period directly with one or more Defendant and suffered economic injury in the form of supra-competitive pricing due to Defendants' conspiracy. These bonds included, but were not limited to, bonds issued by: General Electric Capital, CUSIP 36962G3K8, purchased November 14, 2011; Toyota Motor Credit, CUSIP 89233PA48, purchased November 17, 2011; and Home Depot, CUSIP 437076BG6, purchased March 23, 2020.

22. Plaintiff Holdcraft Marital Trust is a trust organized under the laws of Florida. Plaintiff Holdcraft Marital Trust held an account with Wells Fargo Advisors in which its trustees and/or its financial advisor acting on its behalf traded odd-lots of corporate bonds during the Class Period directly with one or more Defendant (specifically with Wells Fargo) and suffered economic injury in the form of supra-competitive pricing due to Defendants' conspiracy. These bonds were traded with Wells Fargo as the broker dealer and included, but were not limited to, bonds issued by: Goldman Sachs Group, Inc., CUSIP 38141EY29, purchased October 30, 2013; General Electric Capital Corp., CUSIP 36962G4R2, purchased October 30, 2013; JPMorgan Chase & Co., CUSIP 46625HHZ6, purchased October 30, 2013; Safeway Inc., CUSIP 786514BU2, purchased October 30, 2013; Citigroup Inc., CUSIP 172967JT9, purchased November 17, 2015; Dow Chemical Co., CUSIP 26054LF81, purchased August 10, 2015; Ford Motor Credit Co. LLC,

CUSIP 34540TTL4, purchased March 29, 2016; Ford Motor Credit Co. LLC, CUSIP 34540TLV2, purchased May 16, 2016; General Motors Financial Co., CUSIP 37045XBQ8, purchased May 2, 2017; AT&T Inc., CUSIP 00206RDQ2, purchased May 2, 2017; and Citigroup Inc., CUSIP 172967KU4, purchased May 2, 2017.

23. Plaintiff United Food and Commercial Workers Union and Participating Food Industry Employers Tri-State Pension Fund (“UFCW”) is a multi-employer and multi-union employee-based benefit plan based in Plymouth Meeting, Pennsylvania. Through its investment advisers acting on its behalf, Plaintiff UFCW routinely traded odd-lots of corporate bonds directly with certain Defendants during the Class Period and suffered economic injury in the form of supra-competitive pricing due to Defendants’ conspiracy. Odd-lot trades of corporate bonds by UFCW were made with Defendants Bank of America, Barclays, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, JPMorgan Chase, Morgan Stanley, and Wells Fargo. A list of such trades has been attached as Exhibit A to this Amended Consolidated Class Action Complaint.

24. Defendant Bank of America Corporation (“BAC”) is a Delaware corporation headquartered at 100 North Tryon Street, Charlotte, North Carolina 28255. Through its bank and non-bank subsidiaries, BAC, a publicly traded bank holding company, provides a range of financial services and products across the United States. BAC operates four business segments, including Consumer Banking, Global Wealth and Investment Management (“GWIM”), Global Banking, and Global Markets. BAC’s Global Markets business segment offers sales and trading services to institutional clients across fixed-income, credit, currency, and equity businesses. Global Markets’ activities are executed through BAC’s global network of bank and broker-dealer entities. Among Global Markets’ “Core Business Lines” (as defined by Rule 165(d) of Dodd-Frank) is “Global Credit and Special Situations,” which is a dealer in the bonds and loans of

corporate issuers whose coverage includes investment-grade issuers in the U.S. BAC's GWIM business provides comprehensive wealth management services to individuals, businesses, and institutions, including a full set of investment management, brokerage, banking, and lending solutions. BAC finances its business using a globally coordinated funding strategy to provide greater control, consistency, and wider name recognition with investors.

25. Defendant Merrill Lynch, Pierce, Fenner & Smith Inc. ("Merrill Lynch") is a Delaware corporation with its headquarters at One Bryant Park, 1111 Avenue of the Americas, New York, New York 10036, and is an indirect subsidiary of Bank of America Corporation. Defendant Merrill Lynch is a "Material Entity" within BAC, as defined by Rule 165(d) of Dodd-Frank, meaning it is a subsidiary that is significant to the activities of a Core Business Line. Through year-end 2018, Merrill Lynch was the primary U.S. broker-dealer for BAC, serving corporate, institutional, retail through BAC's GWIM, and Global Markets businesses. In May 2019, BAC separated the institutional and retail brokerage business within Merrill Lynch with the retail brokerage business remaining within Merrill Lynch.

26. Defendant BofA Securities, Inc. is a Delaware corporation with its headquarters at One Bryant Park, 1111 Avenue of the Americas, New York, New York 10036, and is an indirect subsidiary of BAC. BofA Securities is a U.S. licensed broker-dealer which, as of May 2019, is responsible for BAC's institutional brokerage business for the GWIM and Global Markets business segments.

27. Defendants BAC, Merrill Lynch, and BofA Securities, Inc. are referred to collectively in this complaint as "Bank of America." Bank of America traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Bank of America charged unlawful, artificial prices to Plaintiffs

and/or the Class. Bank of America, as used in this complaint, includes all of Bank of America's predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

28. Defendant Barclays Capital Inc. ("Barclays") is a Connecticut corporation with its headquarters at 745 7th Avenue, New York, New York 10019. Barclays is a U.S. licensed broker-dealer and is a material U.S. operating entity of Barclays PLC, a public limited company. Barclays engages in investment banking, wealth management, and investment management services in the United States. Through its Credit core business line, Barclays acts as a dealer for, among other things, corporate bonds.

29. Barclays traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Barclays charged unlawful, artificial prices to Plaintiffs and/or the Class. Barclays, as used in this complaint, includes all of Barclays' predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

30. Defendant Citigroup Inc. ("Citi") is a Delaware corporation headquartered at 390-388 Greenwich Street, New York, New York 10013. Citi is a publicly traded registered bank holding company that conducts its business through three segments: Global Consumer Banking, Institutional Clients Group, and Corporate/Other. Citi's three main business lines consists of Banking, Market & Securities Services, and Global Consumer Banking.

31. Defendant Citigroup Global Markets Inc. ("CGMI") is a New York corporation with its headquarters at 390-388 Greenwich Street, New York, New York 10013. It is an indirect subsidiary of the parent, Citi. CGMI is Citi's primary U.S. licensed broker-dealer. CGMI is a market-maker in equities, and a dealer in fixed income securities and commodities. It provides a

full range of products and services, including, among other things, sales and trading, institutional brokerage to a wide range of corporate, institutional, public sector and high-net-worth clients.

32. Defendants Citigroup Inc., and CGMI are referred to collectively in this complaint as “Citigroup.” Citigroup traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Citigroup charged unlawful, artificial prices to Plaintiffs and/or the Class. Citigroup, as used in this complaint, includes all of Citigroup’s predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

33. Defendant Credit Suisse Securities (USA) LLC (“Credit Suisse”) is a Delaware limited liability company with its headquarters at 11 Madison Avenue, New York, New York 10010. It is a U.S. licensed broker-dealer and the main U.S. operating company of its ultimate parent, Credit Suisse Group AG, a global financial holding company. It operates as an investment bank in the United States. Its businesses include securities underwriting, sales and trading, investment banking, private equity, alternative assets, financial advisory services, investment research, and asset management. Credit Suisse is a leading dealer in private and public debt.

34. Credit Suisse traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Credit Suisse charged unlawful, artificial prices to Plaintiffs and/or the Class. Credit Suisse, as used in this complaint, includes all of Credit Suisse’s predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

35. Defendant Deutsche Bank Securities, Inc. (“Deutsche Bank”), is a Delaware corporation with its headquarters at 60 Wall Street, New York, New York 10005. It is a full-service broker-dealer providing brokerage and investment advisory service, investment banking

services and other services. Its main activities include, among other things, fixed income sales and trading and dealer services. It is one of two subsidiaries through which its ultimate parent, Deutsche Bank AG, primarily operates in the United States.

36. Deutsche Bank traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Deutsche Bank charged unlawful, artificial prices to Plaintiffs and/or the Class. Deutsche Bank, as used in this complaint, includes all of Deutsche Bank's predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

37. Defendant The Goldman Sachs Group, Inc. ("Group Inc.") is a Delaware corporation headquartered at 200 West Street, New York, New York 10282. It is a bank holding company and a financial holding company regulated by the U.S. Federal Reserve System ("Federal Reserve"). It reports its activities in four business segments, including "Investment Banking," "Institutional Client Services," and "Investment Management." Group Inc. raises capital for the company and sends its downstream to its subsidiaries to support their business activities. In turn, Group Inc. depends on dividends, distributions, and other payments from its subsidiaries to fund its obligations.

38. Defendant Goldman, Sachs & Co. LLC ("GS&Co.") is a New York limited liability company with its headquarters at 200 West Street, New York, New York 10282. It is a direct wholly owned subsidiary of Group, Inc., and is its principal operating subsidiary in the United States. GS&Co. is a broker-dealer and is responsible for Group Inc.'s Investment Banking, Institutional Client Services, and Investment Management business in the United States. Through its Institutional Client Services business, GS&Co. provides financial products to its clients and acts as a dealer, including in investment grade corporate bonds.

39. Defendants Group, Inc. and GS&Co. are referred to collectively in this complaint as “Goldman Sachs.” Goldman Sachs traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Goldman Sachs charged unlawful, artificial prices to Plaintiffs and/or the Class. Goldman Sachs, as used in this complaint, includes all of Goldman Sachs’ predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

40. Defendant JPMorgan Chase & Co. (“JPMorgan Chase”) is a Delaware corporation headquartered at 270 Park Avenue, New York, New York 10017. It is a financial holding company regulated by the Federal Reserve. It reports its activities in five business segments, including “Corporate & Investment Bank” and “Asset & Wealth Management.” JPMorgan Chase issues debt and equity securities in the capital markets and uses those proceeds to fund and support its subsidiaries and their business activities. In turn, JPMorgan Chase depends on dividends, distributions, and other payments from its subsidiaries to fund its obligations.

41. J.P. Morgan Securities LLC (“JPMS”) is a Delaware limited liability company with its headquarters at 270 Park Avenue, New York, New York 10017. JPMS is JPMorgan Chase’s primary U.S. registered broker-dealer and investment banking entity. Through its Corporate & Investment Bank business, JPMS provides financial products to its clients and acts as a dealer, including in investments grade corporate bonds.

42. Defendants JPMorgan Chase and JPMS are referred to collectively in this complaint as “JPMorgan.” JPMorgan traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, JPMorgan charged unlawful, artificial prices to Plaintiffs and/or the Class. JPMorgan, as used in

this complaint, includes all of JPMorgan's predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

43. Defendant Morgan Stanley ("MS") is a Delaware corporation headquartered at 1585 Broadway, New York, New York 10036. MS is a global financial services firm that, through its subsidiaries and affiliates, provides a wide variety of products and services to a large and diversified group of customers and counterparties. MS conducts its three core business lines (Wealth Management, Investment Management, and Institutional Securities Group) through its subsidiaries.

44. Defendant Morgan Stanley & Co., LLC ("MS&Co.") is a Delaware limited liability company with its headquarters at 1585 Broadway, New York, New York 10036. It is an indirect, wholly owned non-bank subsidiary of MS and serves as MS's primary institutional broker-dealer in the United States.

45. Defendant Morgan Stanley Smith Barney LLC ("MSSB") is a Delaware limited liability company with its headquarters at 1585 Broadway, New York, New York 10036. It is an indirect, wholly owned non-bank subsidiary of MS and serves as MS's primary retail broker-dealer in the United States.

46. Defendants MS, MS&Co., and MSSB are referred to collectively in this complaint as "Morgan Stanley." Morgan Stanley traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Morgan Stanley charged unlawful, artificial prices to Plaintiffs and/or the Class. Morgan Stanley, as used in this complaint, includes all of Morgan Stanley's predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

47. Defendant NatWest Markets Securities Inc. (“NatWest”) is a Delaware corporation with its headquarters at 600 Washington Boulevard, Stamford, Connecticut 06901. It is the primary U.S. broker-dealer of RBS Group plc, a foreign banking organization and financial holding company.

48. NatWest traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, NatWest charged unlawful, artificial prices to Plaintiffs and/or the Class. NatWest, as used in this complaint, includes all of NatWest’s predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

49. Defendant Wells Fargo & Co. (“WF&Co.”) is a Delaware corporation headquartered at 420 Montgomery Street, San Francisco, California 94104. It is a publicly traded financial holding company. Through its direct and indirect subsidiaries, WF&Co. conducts four core business lines, including “Wholesale Banking” and “Wealth and Investment Management,” primarily focusing on the United States.

50. Defendants Wells Fargo Securities LLC (“WFS”) is a Delaware limited liability company with its headquarters at 420 Montgomery Street, San Francisco, California 94104. It is an indirect, wholly owned non-bank subsidiary of WF&Co. and serves as WF&Co.’s primary institutional broker-dealer in the United States.

51. Defendant Wells Fargo Clearing Services, LLC (“WFCS”) is a Delaware limited liability company with its headquarters at One North Jefferson Avenue, St. Louis, Missouri 63103. It is an indirect, wholly owned non-bank subsidiary of WF&Co. and serves as WF&Co.’s primary retail broker-dealer in the United States.

52. Defendants WF&Co., WFS, and WFCS, are referred to collectively in this complaint as “Wells Fargo.” Wells Fargo traded odd-lots of corporate bonds in the United States with Plaintiffs and/or the Class during the Class Period, and as a result of the conduct alleged herein, Wells Fargo charged unlawful, artificial prices to Plaintiffs and/or the Class. Wells Fargo, as used in this complaint, includes all of Wells Fargo’s predecessors, subsidiaries, or affiliates that played a material role in the unlawful acts alleged herein.

AGENTS AND CO-CONSPIRATORS

53. Defendants’ agents, including their officers, employees, or other representatives, ordered, authorized, or performed the acts alleged in this complaint on Defendants’ behalf in the normal course of their duties as Defendants’ agents engaged to manage and operate Defendants’ businesses or affairs.

54. Each Defendant acted as the principal, agent, or partner for each other Defendant with respect to the acts, violations, and common course of collusive conduct alleged herein.

55. Persons not named as Defendants may have committed acts in furtherance of the unlawful antitrust conspiracy alleged herein, such that they may be liable as co-conspirators. Because the record of their conduct lies within their control or the control of the Defendants, Plaintiffs are unable at this time to identify any such co-conspirators by name.

FACTUAL ALLEGATIONS

I. CORPORATE BONDS

A. Basics of Corporate Bonds

56. Bonds are debt similar to a loan or an IOU. The issuer, such as a corporation, issues bonds to raise money for any number of purposes, including augmenting cash, refinancing existing debt, or funding capital investments. The lenders, also known as bondholders, receive from the issuer scheduled payments of a specified rate of interest (the “coupon rate”) during the life of the

bond, as well as the promise to repay the principal (the “face value” or “par value” of the bond) when it matures after a set period of time (the “maturity date”). Bonds allow their issuers to attract a large number of lenders on equal terms in an efficient manner. In the secondary market, the price of a bond is expressed as a percentage of the bond’s par value. Thus, a bid/offer spread of 99/101 means that the dealer is willing to buy a bond at 99% of the bond’s par value and is willing to sell the bond at 101% of the bond’s par value.

57. Corporate bonds have a number of attractive benefits to investors. The bond’s coupon rate provides a predictable income stream of interest payments to bondholders. Upon maturity, the bondholder receives the entire principal amount loaned to the corporation. Bonds are generally regarded to be less volatile in their price movements than many other financial instruments. Bonds are also considered safer than stocks, insofar as they are debt obligations with set payment schedules, and holders of a company’s bonds enjoy priority over holders of the company’s equity shares with respect to claims on the company’s assets in the event of bankruptcy.

58. Like any investment, corporate bonds have risks. These bonds have credit risk and prices could move higher or lower based on the market perception of the issuers’ claim-paying ability. Bonds also have interest rate risk. Bond prices will vary inversely with current interest rates because rising interest rates make the bond’s coupon rate less attractive. To sell an older bond with a lower interest rate, the investor may be required to sell it at a discount. Bonds also have liquidity risks because investors may not be able to find a market to buy or sell the bond. Bonds have call or pre-payment risk because a bond issuer may retire a bond before its maturity date, depriving the investor of receiving the coupon rate until maturity (bonds are more likely to be retired when interest rates are declining, much like a homeowner might refinance a mortgage to benefit from a lower interest rate).

59. The popularity of corporate bonds as an investment vehicle is evidenced by the monetary value of outstanding bonds. According to the Securities Industry Financial Markets Association (“SIFMA”), \$9.567 trillion in U.S. corporate bonds were outstanding as of the end of 2019.⁴ In 2019, average daily trading volume of publicly traded U.S. corporate bonds was \$34.9 billion.⁵

60. As further set forth in the chart below, both the volume and value of corporate bond trading has steadily increased between 2013-2019, with over 16.5 million trades for over \$8.6 trillion in par value in 2019:

Corporate Bonds Annual Trading Volume Data

	2013	2014	2015	2016	2017	2018	2019
Number of trades	10,773,767	10,328,658	10,797,691	12,837,632	13,857,643	15,490,337	16,595,280
Par Amount (\$ Millions)	\$6,174,087	\$6,739,906	\$7,047,997	\$7,530,079	\$7,764,356	\$7,910,259	\$8,623,655

61. The size of a bond trade has no impact on, and is irrelevant to, the terms of the traded bond itself. For any individual corporate bond issue, the characteristics of each bond in that issue – its par value, coupon rate, maturity date, credit rating, type of interest payments, and risks – are identical regardless of whether an investor is trading that bond in an odd-lot or round lot transaction. Bonds of the same company from different issues, and bonds issued by different companies that receive comparable “ratings” from nationally recognized ratings organizations, such as Moody’s, S&P, or Fitch, and are of comparable maturities, are also highly interchangeable.

B. OTC Trading in the Secondary Market Is Highly Concentrated

62. Defendants have dominated the U.S. corporate bond market for well over a decade.

⁴ U.S. Fixed Income Securities Statistics, <https://www.sifma.org/resources/research/us-bond-market-issuance-and-outstanding/> (last visited March 28, 2022).

⁵ MSRB, 2016 Fact Book, <https://www.msrb.org/msrb1/pdfs/msrb-fact-book-2016.pdf>.

63. Data on market shares for initial U.S. corporate bond underwriting is strongly indicative of the market shares (and the ability to control the market) for secondary trading in U.S. corporate bonds. Data from 2014-2018 collected by Bloomberg shows that the Defendants have been among the top firms by market share in the U.S. corporate bond underwriting market almost every year (with the top three firms never changing). Collectively, they have controlled 65% or more of the bond underwriting market every year since at least 2014:

U.S. Corporate Bond Underwriting Market Share (%)					
	2014	2015	2016	2017	2018
JPMorgan	11.9	12.4	11.6	11.5	11.1
Bank of America	10.8	11.4	10.4	10.5	10.8
Citigroup	9	9.9	9.7	9.9	9.2
Morgan Stanley	7.9	7.3	6.9	7.8	7.1
Goldman Sachs	7.6	8.8	7.9	8.5	7.6
Barclays	6.7	6.0	6.0	5.3	6.5
Deutsche Bank	6.5	5.6	5.3	4.1	3.2
Wells Fargo	5.6	6.6	6.8	5.7	6.5
Credit Suisse	4.8	4.5	3.5	3.7	3.7
RBS	2.3	0.7	0	0	0
Defendants' Total:	73.1	73.2	68.1	67	65.7

64. Defendants' large collective market share in the underwriting market for U.S. corporate bonds gives them power to control the supply of the bonds to be sold in the secondary trading market. This enabled Defendants to control the secondary market of U.S. corporate bonds.

65. Defendants have secured a correspondingly larger aggregate share as the top dealers in the Relevant Market (defined below) for secondary trading in U.S. corporate bonds. According to a 2019 Greenwich Associates report, "It is important to re-emphasize the fact that major corporate bond dealers still remain on the other side of most trades. For example, 56% of buy-side [*i.e.*, the Class] volume in U.S. investmentgrade corporate bonds is done with the five largest

dealers.”⁶ Those five dealers are Defendants Bank of America, Citi, Barclays, Goldman Sachs, and JPMorgan, which largely tracked the top dealers in the underwriting market. According to a 2015 survey by Greenwich Associates, the top 10 dealers in the U.S. corporate bond market currently represent approximately 90% of all U.S. trading volume in corporate bonds.⁷ In fact, the market became more concentrated during the Class Period. In 2006, the top 10 dealers in corporate bond trading volume represented 80% of U.S. corporate bond trades.

C. OTC Trading of Corporate Bonds Inhibits Pricing Transparency

66. In the United States, investors trade corporate bonds OTC where pricing is opaque. In contrast, other financial instruments, such as stocks, trade on efficient multi-party platforms, such as exchanges or other similarly structured platforms. There are significant differences between OTC and those trading platforms that are relevant for purposes of this action. The most important difference is the transparency of pricing information available pre-trade. Pre-trade pricing transparency drives competition and invariably leads to substantially lower costs of trading for investors.

67. Exchange-based markets are generally transparent. Investors are informed of the fees/costs they will pay before they trade. Indeed, exchanges provide pricing data to all investors before transactions take place. Before any transaction takes place, brokers on U.S. equity exchanges must provide all investors, whatever their size and sophistication, with the best pricing as designated by the National Best Bid and Offer (“NBBO”) price which discloses the highest bid price and lowest offer price available on any public exchange. Thus, all investors receive the best

⁶ Greenwich Associates, *Corporate Bond Trading in 2019, Competition is Good, Complexity is Not*, at 5 (2019), <https://content.marketaxess.com/sites/default/files/2019-01/Corporate-Bond-Trading-2019-Competition-Good-Complexity-Not.18-2069.pdf>.

⁷ Greenwich Associates, U.S. Corporate Bonds: Investors Need Dealers, Dealers Need Incentives, at 3 (2015); *MSRB, 2016 Fact Book*, at 31.

price then available on the public exchange for the security that they are trading and are able to provide liquidity to the market without the need for intermediating dealers. Thus, for market participants, exchanges provide a centralized market for trading and a centralized information source for the best current bid and offer prices prior to the trade, and the prices at which trades are concurrently transacted.

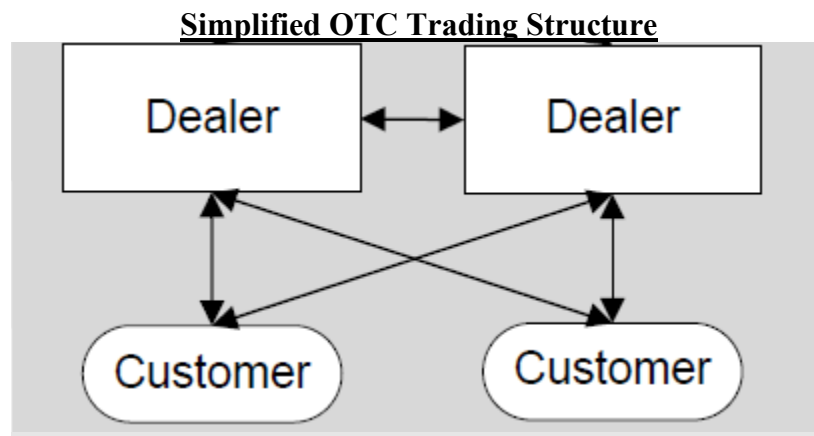
68. Generally, the brokers who manage the exchange platforms through which these investors trade do not act as principals (that buy the security for resale as a dealer) but rather, act as brokers representing the buyer or seller and receiving a commission that is disclosed in advance of each trade. Brokers must provide NBBO pricing to all investors without conflicts of interest related to how valuable the customer is in terms of past relationships or potential future business opportunities.

69. Other than exchanges, another form of trade platforms that provides pre-trade pricing transparency to investors is the all-to-all platforms with the Central Limit Order Book (“CLOB”) trading protocol. CLOBs are used to trade various financial instruments, such as foreign exchange on electronic communication networks (“ECNs”), such as Hotspot and Currenex. A CLOB displays the best outstanding bids and offers to all market participants along with the volumes that can be traded at a given price. The bids and offers are pre-trade transparent, firm prices that can be traded by any participant whether a dealer or a buy-side investor. The following is a simplified illustration of a CLOB for bonds of XZY company:

Bid Volume	Price	Ask Volume
	100.15	30
	100.10	20
	100.05	10
10	99.95	
20	99.90	
30	99.85	

70. In the hypothetical CLOB above, a market participant knows that the best price at which XYZ corporate bonds can be purchased is \$100.05 and the best price at which bonds can be sold is \$99.95. The market participant further knows that volume that can be bought or sold at the best price is up to 10 units. Further, the market participant knows the volumes that can be bought and sold at the second, third, etc., best prices. Importantly, the market participant can see this information before deciding whether to trade.

71. In contrast to all-to-all CLOBs, OTC trading works differently because all negotiation – and thus, all trading – flows through individual dealers, which act as a principal in every transaction. There is little to no pre-trade price transparency in OTC trading. Instead, investors who want to buy or sell corporate bonds request a quote (a “request-for-quote” or “RFQ”) from a specific dealer and must decide, based solely on the extent of the quote provided, whether to transact at the offered price.



72. By way of illustration, assume Investor A requested a quote to purchase and Investor B requested a quote to sell an equal volume (100 bonds) of a corporate bond via dealer X with a par value of \$1,000 on a given day. Under these circumstances, dealer X’s transaction costs and profit would equal the difference between the price at which it bought the corporate bond from Investor B (its bid, expressed as a percentage of the par value) and the price at which it sold the

corporate bond to Investor A (its offer, again expressed as a percentage of the par value), multiplied by the par value and multiplied by the number of bonds traded.

73. Thus, if dealer X responded to Investor A's RFQ at "99 Offer" and Investor B's RFQ at "101 Bid," it would have purchased those 100 XYZ corporate bonds from Investor B at a price of \$99,000 (99% bid times \$1,000 par value times 100 bonds) and sold the 100 XYZ corporate bonds to Investor A at a price of \$101,000 (101% offer times \$1,000 par value times 100 bonds). Dealer X's profit and transaction costs would represent the \$2,000 difference, or the bid-offer spread expressed as a percentage (2%) multiplied by the par value of the underlying XYZ corporate bond (\$1,000 par value) multiplied by the number of bonds traded (100 bonds).

74. RFQs to obtain a bid or offer price can be made in several ways. The RFQ could be placed electronically via a dealer's proprietary bond-trading system; via Bloomberg message to dealers who had previously quoted non-binding "off-the-market" bid-offer spreads on that bond to see what prices they would be willing to trade at now; via a multi-dealer trading platform such as MarketAxess or TradeWeb (although these are open only to institutional investors, and do not provide the kind of transparency in pricing necessary for a competitive market in the sale of all odd-lots); or via phone by calling dealers directly (Bloomberg reports that 80% of U.S. corporate bond trades are still done by phone or chat).

75. There is no requirement that a dealer respond to an RFQ; there is no one platform on which all dealers trade and respond to RFQs; and there is no centralized source of information for all available prices available to investors. Hence, there is no guarantee that an investor is getting the best price possible because the quality of a quote is entirely dependent on which dealers receive and respond to the investor's RFQ(s). Indeed, investors must identify the dealers selected to receive their RFQ. This further entrenches large "core" dealers who would be more likely to

have the bandwidth to respond to the investor's RFQ(s) and reduce potential competition from smaller dealers who may quote better prices for a subset of bond. For example, Hendershott, *et al.* (2020) examine insurance company transactions in the corporate bond market and find that one-third of insurance companies request quotes from only a single dealer, thereby paying higher transaction costs.⁸

76. Once investors select a quote that a dealer has provided in response to their RFQ, they execute the trade with that dealer. Where an individual dealer, rather than an exchange, acts as the transaction intermediary, the dealer can retain whatever undisclosed mark-up it chooses on the transaction.⁹ The customer, who receives only a bid or offer quote, cannot discern what profit the dealer is receiving in its role as a transaction intermediary if that dealer does not execute an offsetting trade on the same day.¹⁰ The lack of price transparency to investors in OTC markets stands in stark contrast to the full transparency on exchanges.

77. Thus, for example, if Investor A wanted to buy \$10,000 of a corporate bond issued by company XYZ, Investor A would direct her wealth management advisor to obtain an RFQ to purchase \$10,000 of that bond. The wealth management advisor, pursuant to the best execution requirements of Rule 5310 of the Financial Industry Regulatory Authority ("FINRA"), would obtain a quote or quotes for that purchase from a dealer or dealers and present the best-priced quote

⁸ T. Hendershott, D. Li, D. Livdan and N. Schurhoff, *Relationship Trading in Over-the-Counter Markets*, JOURNAL OF FINANCE, LXXV 2, at 683-734 (2020).

⁹ On May 14, 2018, the Securities and Exchange Commission ("SEC") enacted amendments to FINRA Rule 2232 (Customer Confirmation) that requires member firms to disclose additional transaction-related information to retail customers for trades in certain fixed income securities. Specifically, amended Rule 2232 requires a member to disclose the amount of mark-up or mark-down it applies to trades with retail customers in corporate or agency debt securities if the member also executes an offsetting principal trade in the same security on the same trading day.

¹⁰ *Id.*

to Investor A. If Investor A decided to buy at that price, she would buy from the dealer, and the markup the dealer included in that price (representing the dealer's transaction costs and profit) would be unknown to Investor A, if the transaction occurred prior to May 14, 2018, and if the transaction occurred after that date, if the dealer had purchased the XYZ bond in an offsetting purchase transaction on another day.¹¹ Instead, the dealer would collect its transaction costs and profit out of the spread between the offer price at which it sold the \$10,000 in XYZ bonds to Investor A, and the bid price at which it bought the \$10,000 XYZ bonds from the issuer, another dealer, or another investor. In such cases the amount of the dealer's costs and profit would be entirely opaque to Investor A (and to the prior seller, for that matter). It would be like buying a home where the buyer knows only what she paid and the seller knows only what she received, but neither knows the commission charged by the agents in between.

78. The lack of pre-trade transparency in the OTC market for U.S. corporate bonds works fully to the advantage of dealers like Defendants. As Bloomberg has noted “the debt market’s lack of transparency . . . has been hugely profitable for the biggest dealers.”¹² As described further below, Defendants have sought to maintain this lack of transparency as part of their anticompetitive efforts to maintain significantly supracompetitive prices for the odd-lots investors.

¹¹ *Id.*

¹² Baker and Leising, *supra* note 3.

II. ECONOMIC EVIDENCE DEMONSTRATES DEFENDANTS' CONSPIRACY TO CHARGE SUPRA COMPETITIVE PRICES FOR ODD-LOTS BONDS VERSUS ROUND LOT BONDS

A. Peer-Reviewed Econometric Research Shows that Dealers Consistently Charge Investors Higher Bid-Offer Spreads for Odd-Lots than Round Lot

79. Research on odd-lot versus round lot trading in the corporate bond market has established that dealers charge investors substantially wider spreads for odd-lots than round lot of the same bond issue at an economically and statistically significant magnitude.¹³ Wider spreads mean higher costs for investors, and conversely, the opportunity for dealers to make greater profits.

80. Beginning in July 2006, FINRA's Trade Reporting and Compliance Engine ("TRACE") system began documenting most corporate bond transactions and making such data available to the public. Dealers in corporate bonds were required by FINRA to report certain trade data to the TRACE program (including par value size, price, whether a transaction was a purchase or a sale, and information regarding whether the counterparty to the deal was a fellow dealer or a customer), with all of the collected data being made publicly available on a delayed basis. TRACE thus provided greater information to investors, and researchers in corporate fixed-income instruments regarding how OTC trading in the secondary market for corporate bonds worked, pricing trends in the market, and other transactional data. TRACE data has two very important limitations, however. First, it is anonymous, meaning the identities of the parties, including the dealers, are not reported. Second, TRACE data is post-trade (data is reported within 15 minutes) as opposed to pre-trade pricing information available in all-to-all trading, such as equities.

¹³ For purposes of this complaint, Plaintiffs are using the term "adverse pricing" or "adverse prices" to describe the scenario by which dealers such as Defendants offer lower bid prices to buy bonds from odd-lot investors, and higher prices to sell odd-lots of bonds to investors. As a result of such "adverse pricing," odd-lot investors are disadvantaged in any U.S. corporate bond transaction – buy or sell – with dealers such as Defendants.

81. Building primarily off TRACE data, many research studies have been undertaken by fixed income experts, which have specifically examined the impact of trade size (odd vs. round lot) on the trading costs paid by investors. The research is peer-reviewed, replicable, and based on reliable data. Given the importance of this topic to the functioning of capital markets, academic papers continue to be published in the top journals in finance by world-class researchers. Within this body of research, an astonishing consensus has emerged: odd-lot trades cost significantly more to transact than larger round lot trades of corporate bonds in the United States. The following table details some of this research:

Study	Time Period	Summary of Cost Findings	Increased % Cost of Odd vs. Round
Adrian, <i>et al.</i> (2017)	2002-2015	Bid-offer spreads for odd-lots are approximately double round lot spreads	100%
Bessembinder, <i>et al.</i> (2017)	2014-2016	One-way (<i>i.e.</i> , one purchase or sale, or half of the bid-offer spread) transaction costs averaged 62 basis points for micro lots (under \$100k); 29 basis points for odd-lots (between \$100k and less than \$1 million); 20 basis points for round lots (\$1 million to less than \$10 million); and 16 basis points for block trades (\$10 million or more)	45%-210%
Biswas, <i>et al.</i> (2015)	2009-2014	One-way transaction costs for bonds under \$100k in par value was 48.5 basis points; for bonds over \$2 million in par value, transaction costs were just 10 basis points	385%
Ciampi & Zitzewitz (2010)	2008-2009	Mean bid-offer spread for all corporate bonds below \$100k was 207 basis points, compared to 112 basis points for all trades between \$100k-499k; 60 basis points for all trades between \$500k-999k; 30-36 basis points for trades above \$1 million	67%-590% (corporate)

Study	Time Period	Summary of Cost Findings	Increased % Cost of Odd vs. Round
Edwards, <i>et al.</i> (2007)	2003-2005	One way transaction costs averaged 46-75 basis points for micro lots (under \$100k); 14-34 basis points for odd-lots (\$100k-less than \$1 million); and between 4-9 basis points for round lot trades (\$1 million and above)	55%-1775%
Feldhutter (2012)	2004-2009	Average round trip transaction costs for odd-lots were between 21-54 basis points (depending on trade size), compared to 19 basis points for round lot trades	10%-184%
Harris (2015)	2014-2015	Mean effective half-spread of 77.3 basis points for micro lot trades below \$100k; 40.2 basis points for odd-lot trades between \$100k and less than \$1 million; 31.1 basis points for round lot trades between \$1 million and less than \$5 million; and 30.2 basis points for block trades of \$5 million or more	29%-156%
Hendershott & Madhavan (2015)	2010-2011	Average one-way transaction costs for micro lot trades below \$100k were 87.9 basis points for voice trades and 22 basis points for electronic trades; 46.7 basis points for voice trades and 13.8 basis points for electronic trades for odd-lots of \$100k to less than \$1 million; 15 basis points for voice trades and 10.5 basis points for electronic trades for round lots of \$1 million to less than \$5 million; and 11.2 basis points for voice trades and 8.9 basis points for electronic trades for block trades of \$5 million or more	211%-685% (voice) 31%-147% (electronic)
Ritholtz (2016)	2003-2015	Average bid-offer spreads of 104 basis points for micro lot trades below \$100k; 28 basis points for odd-lot trades between \$100k and less than \$1 million; and 13 basis points for round lot and block trades of \$1 million or more	115%-700%

Study	Time Period	Summary of Cost Findings	Increased % Cost of Odd vs. Round
White (2017)	2005-2017	Bid-offer spreads for retail corporate bond transactions (transactions less than \$100k) are over 50 basis points higher than that of institutional transactions (transactions greater than \$100k)	N/A
Zitzewitz (2010)	2008-2010	One-way transaction costs averaged 132 basis points for trades less than \$100k; 44 basis points for transactions over \$500k	200% (increase for trades under \$100k vs. trades over \$500k)

82. Collectively, these studies show that investors in corporate bonds pay average transaction costs (represented by the bid-offer spread) that are between 10% (Feldhutter) to as much as 1,775% (Edwards) greater for odd-lots than round lots. In dollar terms, using the most recent available (and relatively conservative) analysis by Bessembinder (2017) estimating the one-way (*i.e.*, just for a single purchase or sale) transaction costs for corporate bonds, a \$700,000 odd-lot purchaser or seller would pay \$2,030 ($\$700,000 \times 29$ basis points, or 0.0029) in transaction costs, whereas an investor purchasing or selling a \$1 million round lot would pay \$2,000 ($\$1 \text{ million} \times 20$ basis points, or 0.0020). While the dollar amounts for the two transactions are similar, the **percentage** of each investor's cost is not: 0.29% for the odd-lot trade versus 0.20% for the round lot trade. In a truly competitive market where dealers competed and drove down the odd-lot pricing to the same level as round lots – 0.20% in this case – the \$700,000 odd-lot investor would pay in absolute dollars only \$1,400 – a substantial difference of \$630 that dealers are currently able to impose on their odd-lot counterparties.

83. The disparity in transaction costs becomes even larger and more inequitable for investors trading in smaller amounts, demonstrated by comparing the total costs paid by such investors for trading in the same volume of bonds as one round lot trade. For example, an investor purchasing \$50,000 in a given corporate bond would pay \$310 ($\$50,000 \times 62$ basis points, or

0.0062) in transaction costs according to Bessembinder's model. This means 20 investors trading a total of \$1 million in par value in corporate bonds in \$50,000 increments would pay a total of \$6,200 in transaction costs, or *more than three times* as much as the \$2,000 a single \$1 million round lot trade.

84. The impact of this adverse pricing for odd-lot trades has cost investors billions of dollars. For instance, the U.S. corporate bond market in 2018 had \$7.91 trillion in annual trading volume by par value, and approximately 18% of this par value volume, or \$1.4238 trillion, was estimated to be in odd-lots. Using Bessembinder's estimate of 29 basis points for trades between \$100,000 and \$1,000,000, the total transaction costs for odd lots was \$4.13 billion ($\$1.4238 \text{ trillion} * 0.0029$). If this portion instead traded at the 20 basis point transaction cost Bessembinder found for round lots, the total transaction costs would be just \$2.85 billion ($\$1.4238 \text{ trillion} * 0.0020$). The difference, or \$1.281 billion, is a conservative measure of the supracompetitive transaction costs in 2018 alone, because Bessembinder actually found for micro lots (trades less than \$100,000) the cost was 62 basis points – over three times the cost of round lots.

85. Many of the studies listed above utilize data obtained shortly after the introduction of TRACE in 2006. Thus, it is important to determine whether the U.S. corporate bond market still exhibits the supracompetitive transaction costs documented above. Two peer-reviewed papers published in top finance journals during 2020 and 2021 update the earlier studies and offer resounding support for the ongoing disparity in transaction costs between odd-lot and round-lot transactions in U.S. corporate bond market. For example, Bessembinder, *et al.* (2020) show that odd-lot corporate bond trading costs exceed 60 basis points as compared to round-lot costs of less than 20 basis points. Similarly, O'Hara and Zhou (2021) find transaction costs of 60 basis points

for voice, dealer-intermediated trades of up to \$100,000 as compared to 10 basis points for round-lot and block trades of investment-grade bonds.

86. In sum, numerous peer-reviewed academic studies demonstrate that dealers continue to charge investors substantially wider spreads for odd-lots than round lot transactions in the same bond issue at the same point in time. This differential persists in the dealer-dominated non-transparent, voice market despite developments within the U.S. corporate bond market.

B. No Legitimate Economic Justification Supports the Substantial Differences in Spreads Between Odd-Lots and Round Lots

87. There is no explanation consistent with a healthy, competitive market for why the differential in spreads between odd-lots and round lots has persisted to the degree it has. First, the difference between odd-lot and round lot spreads defies economic theory, which posits that larger trades carry more risk and therefore should face wider spreads. Second, foreign markets, with considerably less volume and liquidity, but that trade all-to-all on exchanges with pre-trade price transparency and robust competition, have reduced if not entirely eliminated the differences in spreads for odd-lots and round-lots. Investors in those foreign markets pay narrower spreads for odd-lots than investors in the U.S. pay for round lots. Third, in the U.S., when bonds traded on the NYSE prior 1946, the relationship between trading costs and trade sizes were much flatter. This evidence demonstrates that there are no legitimate economic reasons for the substantial differences in odd-lot and round lot spreads.

1. Economic Theory Predicts Spreads Should Widen as Trade Size Increases

88. As the Financial Economists Roundtable has stated, the corporate bond market represents a situation where “[p]erversely, these transaction costs rise as the trade size decreases”

and “a relatively small trade of \$50,000 may cost, on a percentage basis, five or 10 times more than a large trade arranged by a financial institution.”¹⁴

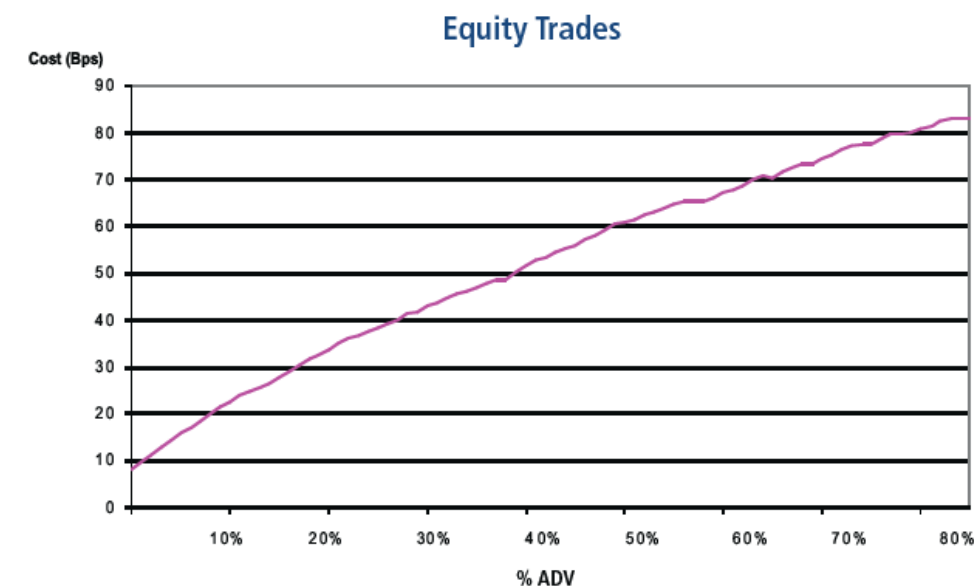
89. Economic theory dictates that competitive spreads are determined by the marginal cost of providing dealer services. The marginal cost of large round-lot transactions exceeds that of odd-lot trades, thereby exhibiting the diseconomies of scale that result in the higher round-lot spreads observed in U.S. equity markets. However, dealers also incur fixed costs associated with their market making activity, consisting of the overall cost of capital and infrastructure costs inherent in a dealership operation. To compensate dealers for fixed costs, dealers charge a commission. In a competitive market, dealers would price low marginal cost odd-lot trades at low spreads in order to increase their trading volume (*i.e.*, attract large numbers of odd-lot trades) so as to cover fixed costs with fixed commissions. There is no economic justification for the wider odd-lot and narrower round-lot spreads observed in the U.S. corporate bond market.

90. Furthermore, larger trades pose a greater risk to the dealer. Larger trades pose a greater inventory risk to the dealer, because larger trades require dealers to hold more unbalanced inventory, therefore increasing their risk of losing money if the market moves against them. Moreover, investors undertaking large transactions may have access to private information that will adversely impact the dealer’s position. That is, a large sale order may signal that the investor has negative information about the bond’s value. Therefore, an uninformed dealer filling that order (by buying the bond) is exposed to adverse selection when the bond’s price falls. On the other hand, the investor may be selling large amounts of the bond for liquidity reasons that are unrelated to the bond’s fundamental value. Since the dealer cannot distinguish between these two motives

¹⁴ Larry Harris, Albert S. Kyle, Erik R. Sirri, *Statement of the Economists Roundtable, April 2015: The Structure of Trading in Bond Markets*, at 6, FINANCIAL ANALYSTS JOURNAL (November/December 2015) (emphasis added).

for the investor's transaction, it is well established in financial microstructure theory that dealers will quote defensively by widening spreads for larger orders. Thus, economic factors imply that financial markets are characterized by diseconomies of scale in trade size, *i.e.*, traders charge wider spreads for larger trades.¹⁵

91. Consistent with this economic theory, the U.S. equity markets show increased transaction costs for larger sized transactions.¹⁶ By contrast, in the corporate bond market, spreads narrow with trade size.¹⁷

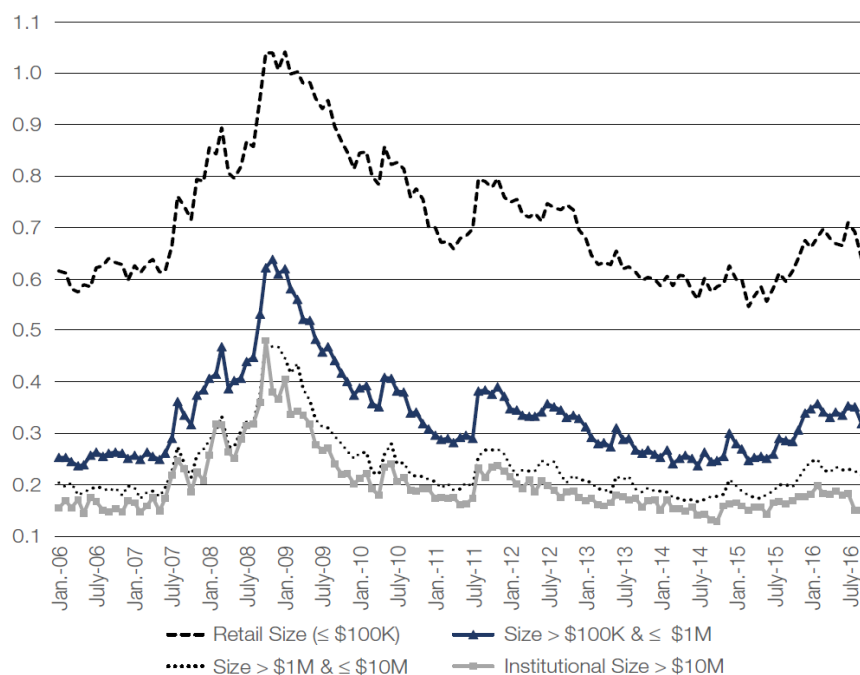


¹⁵ Thomas S.Y. Ho and Hans R. Stoll, March 1981, *Optimal Dealer Pricing Under Transactions and Return Uncertainty*, JOURNAL OF FINANCIAL ECONOMICS 9, at 47-73 (1981).

¹⁶ Minderides, *Efficient Fixed Income Execution*, FTSE Global Markets, September/October (2007).

¹⁷ H. Bessembinder, C. Spatt, and K. Venkataraman, *A Survey of the Microstructure of Fixed-Income Markets*, JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS, 55, 1 (2020) pp. 1-45, at p. 21 Figure 3 Panel B.

Graph B. Monthly Corporate Bond Trading Costs (%) on Customer Transaction by Trade Size



92. Transaction costs on bond trades have two components: (1) the spread between dealer bids and offers, plus (2) commission rates, which are approximately \$1 per bond traded. Regulators require dealers to disclose their commission rates on a pre-trade basis

93. Fixed commission rates contribute to the bank's overhead and cover the fixed costs of trading that dealers incur. Those fixed costs are associated with their market making activity, consisting of the overall cost of capital and infrastructure costs inherent in a dealership operation. The fixed costs of maintaining a dealer presence in the OTC corporate bond market are virtually inseparable from the general overhead costs of banking. Participation in this important market is necessary for the bank to perform all of its other functions, such as underwriting, asset

management, trust business, etc. Spreads do not cover the fixed costs of participating in the corporate bond market.¹⁸

94. Unlike commissions rates, spreads are not disclosed, and the opacity of the bond market makes it impossible for investors to know the spreads imbedded in their bond prices, thereby allowing dealers to set supra-competitive spreads for odd-lot transactions.

95. Economic theory dictates that competitive spreads are determined by the marginal cost of providing dealer services. However, the economic evidence shows that spreads well exceed marginal costs. Further, the marginal cost of large round-lot transactions exceeds that of odd-lot trades in transparent markets, thereby exhibiting the diseconomies of scale that result in the higher round-lot spreads observed in U.S. equity markets. In a competitive market, dealers would price low marginal cost odd-lot trades at low spreads in order to increase their trading volume (*i.e.*, attract large numbers of odd-lot trades) so as to cover bank overhead costs with fixed commissions on each trade. There is no economic justification for the higher odd-lot and lower round-lot spreads observed in U.S. corporate bond markets.

96. As noted below, the “perverse” pattern between spreads and trade sizes observed in the corporate bonds market persists today and can only be explained by the lack of pricing transparency in the opaque corporate bond market as the result of Defendants’ collusion.

2. Foreign Odd-Lot Bond Trading Demonstrates that the Adverse Pricing of Bond Odd-Lots Is Not Explained by Limitations in Liquidity

97. Odd-lots are actively traded – as discussed earlier, odd-lots in corporate bonds represent approximately 90% of daily trades by number of trades, and approximately 18% of total trading volume. Further, the number and volume of odd-lot trades have grown since 2006. The

¹⁸ There is neither an economic nor a business foundation for the specious claim that spreads on round lot trades should be lower because costs can be spread over a larger lot of bonds.

size of the annual trading market in U.S. corporate bonds – over \$7 trillion – shows that lack of liquidity or trading activity is not the explanation for adverse odd-lot pricing.

98. Indeed, “many bonds trade as actively as do small and some mid-cap stocks,”¹⁹ and the disparity between odd-lot transaction costs and round lot transaction costs persists within the same bond issues, regardless of how actively they trade. If a general lack of activity or liquidity in a specific corporate bond were the cause of higher transaction costs, the effect would be felt by both odd-lot investors and round lot investors in that bond. Goldstein & Hotchkiss (2020) find spreads for infrequently traded bonds are lower than for frequently traded U.S. corporate bonds.²⁰

99. In addition, foreign corporate bond markets (with fewer market participants and far less liquidity than the U.S. corporate bond market) have successfully reduced (if not eliminated entirely) any differential in pricing between round lot and odd-lot trades, which contradicts any suggestion that liquidity or trading activity (or any other legitimate economic force) is the cause of adverse odd-lot trade pricing in the United States. The success of these foreign markets in reducing and/or eliminating entirely any adverse pricing for odd-lot trades suggests that the adverse pricing in the U.S. corporate bond market is not the result of unilateral conduct, but rather collusive conduct by Defendants.

100. In Israel, for example, the Tel Aviv Stock Exchange (“TASE”) operates a corporate bond exchange that began operations in 1953. Banks and brokerage firms with membership on the exchange provide their clients with online access to the exchange where they can submit orders, trade anonymously, and view the status of an online order book that is updated in real-time. In

¹⁹ Larry Harris, *Transaction Costs, Trade Throughs and Riskless Principal Trading in the Corporate Bond Market* (Oct. 22, 2015).

²⁰ M. Goldstein and E. Hotchkiss, *Providing Liquidity in an Illiquid Market: Dealer Behavior in US Corporate Bonds*, JOURNAL OF FINANCIAL ECONOMICS, 135, at 16-40 (2020).

this way, TASE (and its member banks and brokerage firms) provides investors with pre-trade price transparency and competitive pricing.

101. The TASE bond exchange is much smaller than the U.S. corporate bond market. Volume traded in TASE's corporate bond market comprising only 1% of the American corporate market – \$80 billion vs. \$7.48 trillion – and is quite isolated, with foreign entities holding only 0.9% of all corporate bonds. However, as reported by Abudy and Wohl (2017), despite TASE's smaller size and isolation, the TASE bond exchange is “a lively market with many transactions per bond-day, very little off-exchange trading and low spreads: the average transaction half spread is 0.078% [or 7.8 basis points]. This figure is much lower than the comparable figures in the U.S., especially for ‘retail size’ transactions [which Abudy and Wohl define as transactions by investors with less than \$559,000 in all TASE securities].” The Israeli corporate bond market has better pricing for odd-lot sized transactions than the United States market, given that the 7.8 basis point transaction cost Abudy and Wohl calculate for the average TASE bond exchange is lower even than Bessembinder's (2017) 20 basis point transaction cost *for round lots*.

102. The Italian bond market likewise functions without forcing odd-lot investors to incur adverse pricing when they buy or sell corporate bonds.

103. The Italian bond market is the largest in Europe and the third largest in the world after the United States and Japan. The Italian market includes an outsized retail investor presence, as direct holdings of fixed-income securities (such as corporate bonds) by households are as high as 20% of total financial holdings in Italy (or even higher), compared to between 10%-15% in Germany and typically less than 5% in other countries, including the United States.²¹

²¹ Bruno Biais, *et al.*, *European Corporate Bond Markets: Transparency, Liquidity, Efficiency*, CENTRE FOR ECONOMIC POLICY RESEARCH (May 2006).

104. To serve this large retail investor presence, the Italian corporate bond market has created multiple electronic platforms for the trading of odd-lots of corporate bonds. The Borsa Italiana in Milan (Italy's only stock exchange, which is owned by the London Stock Exchange) owns a 70% share in EuroTLX, which specializes in retail-size trades.²²

105. Borsa Italiana's EuroTLX has been operating since 2003, targeting "non-professional and professional investors trading in retail size and focus[ing] on fixed income securities and investment products. EuroTLX offers the possibility of trading electronically a wide range of financial instruments with a high level of transparency on prices and on pre- and post-trade information."²³ Because of EuroTLX's success in catering to retail investors (precisely the types of investors who trade in smaller odd-lots), it "has been included in the Best Execution Policy of Italian brokers."²⁴

106. Notably, studies have found that EuroTLX, with its retail focus on investors more likely to trade in odd-lots, outperforms dealers in the U.S. in terms of liquidity and bid-offer spreads in odd-lots. A November 2008 study by EuroTLX itself found that the bid-offer spread for bonds on EuroTLX were generally between 20-25 basis points; a later 2014 report confirmed this calculation.²⁵ This average bid-offer spread of 20-25 basis points represents a one-way transaction cost of 10-12.5 basis points for the primarily odd-lot transaction on EuroTLX, well

²² See <https://www.eurotlx.com/en/chi-siamo/>.

²³ See <https://www.eurotlx.com/en/chi-siamo/>.

²⁴ *Id.*

²⁵ See *Scambi sui bond alla prova della liquidita*, TLX, https://www.eurotlx.com/sites/default/files/Scambi_sui_bond_alla_prova_della_liquidita.pdf; *The Liquidity of Dual-Listed Corporate Bonds*, COMMISSIONE NAZIONALE PER LE SOCIETA E LA BORSA, http://www.consob.it/documents/11973/204072/qdf79.pdf/bc36834b-bd60-4810-a2e0-b4012c4d_040b.

below the 20 basis points Bessembinder (2017) observed for round lots, and the 29 basis points Bessembinder observed for odd-lots, in the United States.

107. That smaller foreign corporate bond markets can provide investors with narrower bid-offer spreads for odd-lots, and therefore more competitive, pricing than in the United States strongly suggests adverse pricing for odd-lots in the larger U.S. corporate bond market is the result of collusion and is not economically justified.

3. Historical Evidence in the U.S. Demonstrates Odd-Lots of Bonds Did Not Trade at Adverse Prices Compared to Round Lots

108. There is nothing about the odd-lot market that justifies the high spreads taken by Defendants. Historically, trading costs for odd-lots in the U.S. corporate bond market was much lower than today, and lower than in the Class Period 2006-2019.

109. Prior to 1946, retail investors were prevalent in the corporate bond market, and bonds primarily traded on exchanges such as the NYSE. During this time period, odd-lot trading dominated the market, with trading in round lots limited to only a few very active issues, and institutional investors (who preferred round lots) forced to wait for new issues of bonds to buy in round lot sizes or deal with bond-trading firms that accumulated odd-lots of bonds, combined them into round lots, and then sold them as round lots to institutional investors at a premium. Only after the Great Depression (when private retail investors lost about 75% of their bond holdings due to default, call, or maturity) and World War II, did institutional investors dealing in round lots come to dominate the (now OTC/dealer) bond market. By 1946, there was no significant active exchange-based corporate bond market on the NYSE.²⁶

²⁶ Bruno Biais and Richard C. Green, *The Microstructure of the Bond Market in the 20th Century*, at 3 (2007).

110. In a study by Biais and Green (2007), the authors found that “[i]n the 1940s, despite fixed commissions, costs for retail investors trading corporate bonds were as low or lower than they are today in OTC markets.” Biais and Green also found that during the pre-World War II period, trade costs were more uniform across all trade sizes – “the relationship between trading costs and trade size is much flatter in the historical exchange data than in the modern samples. . . . *[w]hat is most puzzling, in our view, is that costs in the modern data are as high as they are relative to the historical costs.*”²⁷

111. History has shown no meaningful improvement, despite technological changes and the growth in the number and volume of odd-lot trades that should (in a competitive market) be driving odd-lot spreads toward parity with round lot spreads. Instead, the spread differential has actually widened through the collusive acts of the Defendants, enabling them to charge investors more for odd-lots than what they would be charged in a competitive market free of such collusion, and considerably more than the spreads paid by investors for round lots in the same bond issues.

112. Dealers sometimes justify the higher spreads and poor execution quality (particularly for odd-lot investors) in the U.S. corporate bond market with the argument that when markets are imbalanced, dealers are expected to commit capital in order to provide liquidity (*i.e.*, by taking stressed bonds into the dealer’s inventory), similar to the historical role of specialists in maintaining orderly markets. However, O’Hara & Zhou (2020) shows that when the Covid pandemic hit in March 2020, the RFQ dealer-dominated trading system did not provide liquidity. The Federal Reserve had to step in with dealer of last resort guarantees.²⁸ This finding is

²⁷ *Id.* at 28 (emphasis added).

²⁸ Maureen O’Hara and Xing (Alex) Zhou, *Anatomy of a Liquidity Crisis: Corporate Bonds in the COVID-19 Crisis*, 142 JOURNAL OF FINANCIAL ECONOMICS 46-68 (Oct. 2021).

confirmed by Di Maggio *et al.* (2017) who examine dealer spreads in the wake of the Lehman bankruptcy.²⁹

C. Plaintiffs’ Expert Analysis Confirms that Defendants Charge Higher Transaction Costs to Odd-Lots Investors than Round Lot Investors

113. Plaintiffs also engaged their own experts to analyze U.S. corporate bonds trading data. Following the methodology of peer-reviewed academic studies published in top finance journals, Plaintiffs’ experts performed two sets of analysis. In the first analysis (designated the “RPT analysis”), Plaintiffs’ experts test whether odd-lot transaction costs exceed round-lot costs for brokered trades that require no risk-taking or investment on the part of the dealer. In the second analysis (designated the “price gouging analysis”), Plaintiffs’ experts measure the size of supra-competitive returns earned by Defendant dealers from discriminating against odd-lot investors using the opaque market structure preserved by their conspiracy.

1. The RPT Analysis Shows That Dealers Charged Wider Spreads for Odd-Lots vs. Round Lots

114. The first analysis examines the transaction costs (measured by spreads) for U.S. corporate bond trades that do not require the market making services of dealers. These are known as “Riskless Principal Trades” (hereinafter, “RPTs”). In an RPT, the dealer simultaneously purchases and sells a bond. That is, the dealer does not experience any inventory risk, as it is acting merely as an intermediating counterparty to the buyer and seller – resulting in no net impact on the dealer’s portfolio. In a market with all-to-all CLOB trading (such as would exist on the electronic platforms in the absence of Defendants’ anticompetitive conduct), RPTs would be rare, if unnecessary, as the buyer and seller could deal directly with each other, cutting out the dealer

²⁹ Marco Di Maggio *et al.*, *Interest Rate Pass-Through: Mortgage Rates, Household Consumption, and Voluntary Deleveraging*, 107(11) THE AMERICAN ECONOMIC REVIEW 3550-3588 (Nov. 2017).

intermediary and reaping substantial cost savings. Indeed, RPTs would be akin to the direct trades between buyers and sellers that are intermediated by a broker. The broker would be paid a commission, but spreads would approach zero for all trades of all sizes. Further, economic theory suggests that odd-lot spreads should not be wider than round-lot spreads in RPTs.

115. In transparent exchanges such as the U.S. equity market, brokers intermediate transactions less expensively than dealers. Brokers act as agent match makers bringing buyers and sellers together without taking any risk or ownership positions. In contrast, dealers act as principals, providing liquidity to the market by investing their own balance sheet resources, thereby incurring risk. RPTs are effectively intermediated by brokers, not dealers, and thus economically, these trades should have spreads that are similar to those observed on brokered exchanges. Therefore, just as in equity markets, odd-lot spreads should not be higher than round-lot spreads. The first set of Plaintiffs' expert analysis, therefore, measures the spreads for these brokered trades of U.S. corporate bonds, and finds that the disparity between odd-lot and round-lot spreads persists.³⁰ Thus, the supra-competitive transaction costs observed in the OTC corporate bond market are not the result of dealer-provided liquidity services, but can instead be explained through defendants' stifling of competition.

116. Plaintiffs' experts utilized FINRA's TRACE database and analyzed the spreads for RPTs in the U.S. corporate bond market from January 2006 to December 2019 across four trade sizes: (1) less than or equal to \$50,000; (2) \$50,001 to \$100,000; (3) \$100,001 to \$1 million; and

³⁰ All analysis focuses on spreads which should spread zero for brokered trades such as RPTs. Additionally, fixed commissions are charged in the OTC corporate bond market to cover the fixed cost of trading. Fixed commissions cannot explain the difference in spreads between odd-lots and round-lots RPTs and are excluded from the analysis.

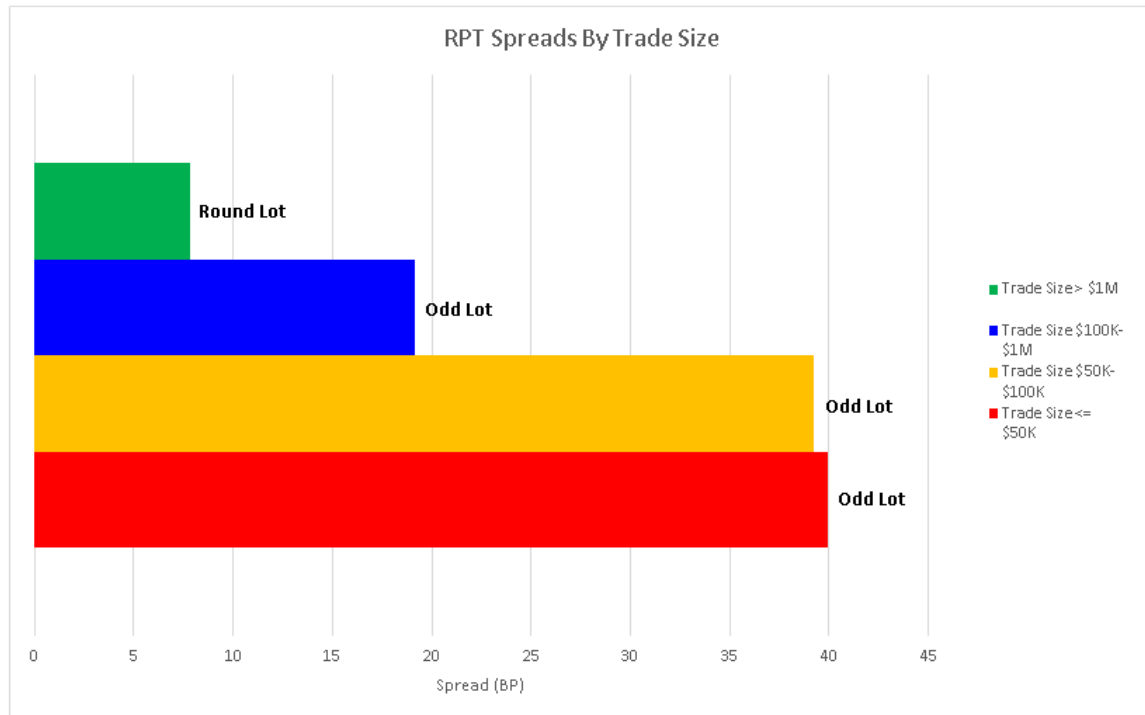
(4) greater than \$1,000,000. RPTs require broker, not dealer intermediation. The spread is defined as the price paid by the customer buyer minus the price received by the customer seller.

117. In the analysis performed by Plaintiffs' experts, RPTs are defined in the TRACE database as buy and sell trades that occur almost simultaneously – *i.e.*, within one minute of each other. The analysis focused on trades in which the trade amount for each specific corporate bond is the same for both the purchase and sale transaction. Thus, the dealer does not have any mismatch in amounts which may cause inventory risk that could justify a spread for the transaction. Instead, trade size is matched upon inception of the buy/sell transaction, and therefore irrelevant to the broker. Thus, there should be no difference in spreads across RPTs of different trade sizes. *Of special relevance to this case, there should be no difference in the spreads in RPTs for round lot versus odd-lot RPTs.*

118. The analysis found the opposite. It found statistically and economically significant differences in spreads for round lot and odd-lot trades over the period from 2006-2019. The analysis shows that dealers charge considerably wider spreads for odd-lot RPTs when compared to round lot RPTs, even when dealing with larger odd-lot transactions. The following chart shows that the transaction costs for smaller odd-lot RPTs (less than or equal to \$100,000 in size, which are sometimes referred to as “micro lots”) average around 40 basis points, with spreads for larger odd-lot trade sizes of between \$100,000 to \$1 million averaging 19 basis points. By comparison, round lots trades exceeding \$1 million cost only around eight basis points to execute. All empirical results involving RPT spreads are both economically and statistically significant. Statistical tests resoundingly (at the 99.999% probability level) reject the possibility that these results are driven

by outliers. Further, the results are robust to Plaintiffs' experts' use of winsorizing techniques³¹ that remove outliers from the analysis.

RPT Analysis, 2006 - 2019
RPT Average Spreads by Trade Size, 2006 - 2019



Notes & Sources:

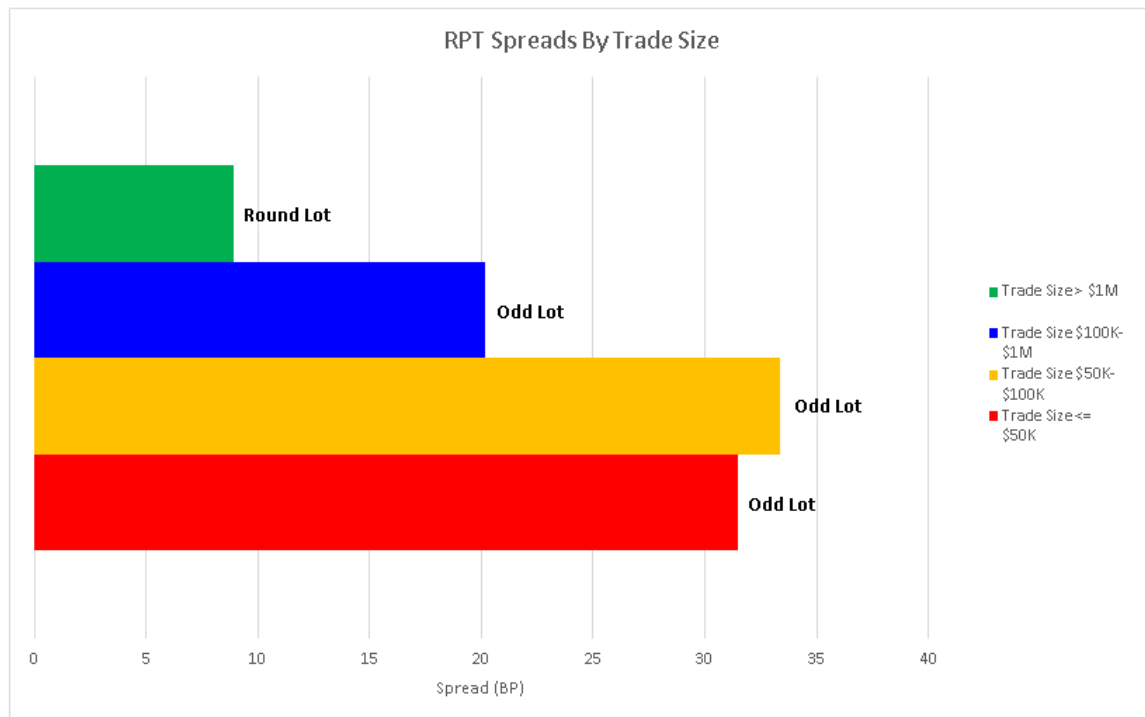
FINRA's Enhanced TRACE bond trading data, 2006 - 2019.

119. Further, breaking out the analysis for a four year subperiod indicates that this anti-competitive behavior persisted after the April 21, 2016 statutory period alleged by Defendants. The following chart shows that spreads during April 2016 through the end of 2019 average 32 basis points for odd-lot trades less than or equal to \$50,000, more than 33 basis points for odd-lot trades between \$50,000 to \$100,000 in size and 20 basis points for odd-lot trades between \$100,000 to \$1 million. In contrast, spreads for round lot RPTs (over \$1 million) during this period average only nine basis points. These differences are statistically and economically significant.

³¹ Winsorizing is a well-accepted method that limits extreme values in the statistical data to reduce the effect of possibly spurious outliers.

RPT Analysis, April 21, 2016 - 2019

RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019.

120. Academic literature shows that in 2015 alone, higher spreads on just RPT odd-lot transactions resulted in a transfer of \$667 million from customers to dealers. The markup on spreads for all odd-lot transactions was even higher, into the billions of dollars. Updated for the 12 months ending in the third quarter of 2019, Harris and Mehta show that supra-competitive RPT spreads transferred \$612 million from customers to dealers.³² But for Defendants' conspiracy, increased market transparency, such as all-to-all electronic trading platforms with CLOB trading protocol, would have alerted customers that they could have executed at better prices, saving billions of dollars. Indeed, economic theory suggests that spreads should have approached zero for all RPTs of all trade size.

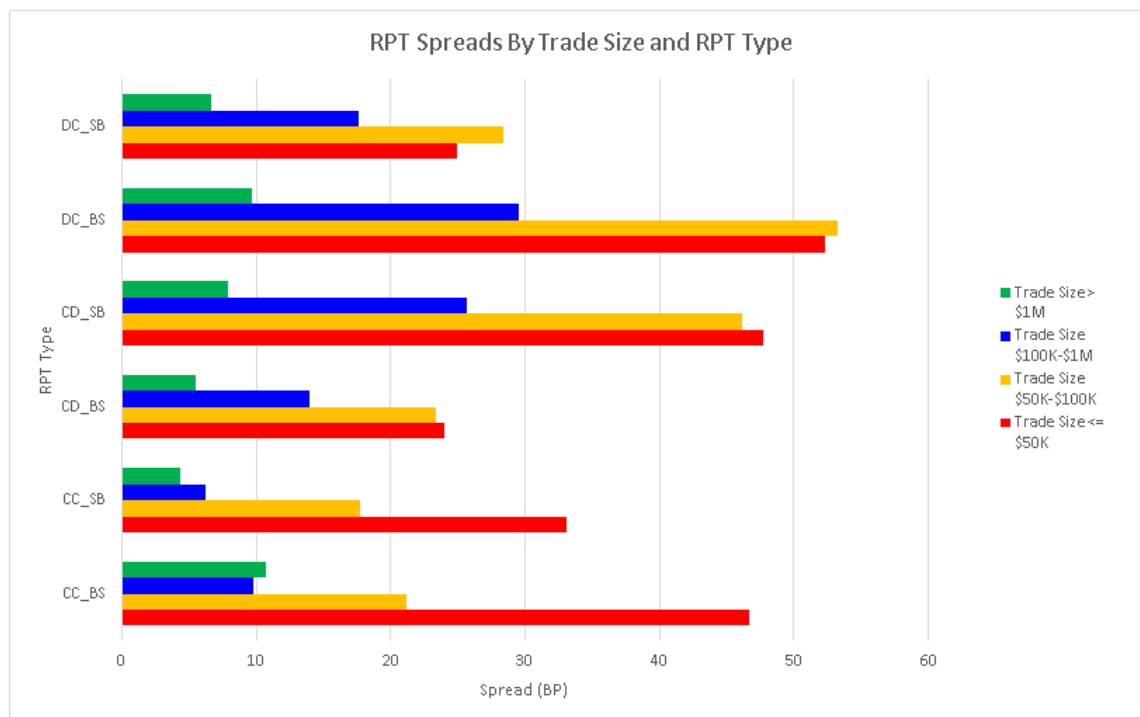
³² Lawrence Harris and Anindya Mehta, *Riskless Principal Trades in Corporate Bond Markets* (Aug. 26, 2020), SSRN: <https://ssrn.com/abstract=3681652>.

2. RPT Analysis Shows that Spreads for Odd-Lot Trades Are Wider than Round Lots Regardless of RPT Type

121. Consistent with Defendants' thwarting competition in the Relevant Market, the economic analysis of RPTs found economically and statistically significantly wider spreads for odd-lot RPTs when compared to round lot RPTs regardless of RPT type. The different types relate to timing and sequencing of the trades, which are described at the bottom of the chart, which summarizes these results.

RPT Analysis, 2006 - 2019

RPT Average Spreads by Trade Size and RPT Type, 2006 - 2019



Notes & Sources:

FINRA's Enhanced TRACE bond trading data, 2006 - 2019.

Definitions of field headers:

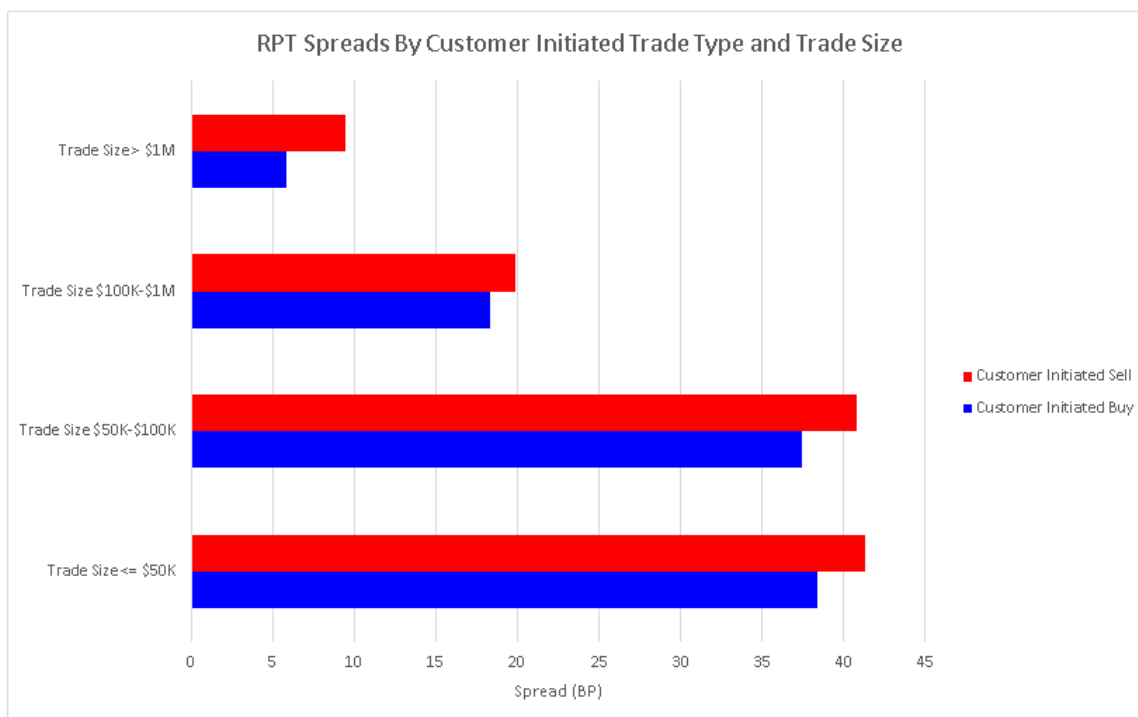
CC_BS Customer to Customer crossing RPTs where the dealer first buys from the customer and then sells to another customer.
 CC_SB Customer to Customer crossing RPTs where the dealer first sells to the customer and then buys from another customer.
 CD_BS Customer to Dealer normal RPTs where the dealer first buys from the customer and then sells to another dealer.
 CD_SB Customer to Dealer normal RPTs where the dealer first sells to the customer and then buys from another dealer.
 DC_BS Dealer to Customer normal RPTs where the dealer first buys from another dealer and then sells to the customer.
 DC_SB Dealer to Customer normal RPTs where the dealer first sells to another dealer and then buys from the customer.

122. The RPT analysis further shows that spreads for customer-initiated sales are wider for odd-lots as compared to round-lot trades. The following chart shows that odd-lot RPT sales

initiated by customers have spreads that are statistically and economically wider than all other trade types. These results are statistically significant (at the 99.999% level) and robust to winsorizing to test for the possibility of outliers.

RPT Analysis, 2006 - 2019

RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019



Notes & Sources:

FINRA's Enhanced TRACE bond trading data, 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

3. Defendants Charged Average Wider Spreads for Odd-Lots vs. Round Lots

123. Given the highly concentrated secondary trading market, it is clear from the foregoing analysis of dealer RPT spreads that Defendants also charge wider spreads for odd-lots versus round lots with no corresponding risk rationale. Plaintiffs have gone a step further and analyzed a subset of actual trades by Defendants to confirm this point.

124. Publicly available TRACE does not identify dealer names, and therefore Plaintiffs' experts used the insurance company database and academic methodology referenced earlier in

order to identify specific trades by Defendant dealers. Plaintiffs' experts matched the RPTs obtained from TRACE to the NAIC database that provides dealer names for insurance company corporate bond purchases.³³ Plaintiffs' experts matched the RPTs from TRACE to NAIC transactions using the date of the trade, the CUSIP of the bond and the trade size bucket (using the four sizes: (1) less than or equal to \$50,000; (2) \$50,001 to \$100,000; (3) \$100,001 to \$1 million; and (4) greater than \$1,000,000). For example, if JP Morgan was the dealer on a purchase of a specific bond in the odd-lot amount of \$25,000 on a specific date, then Plaintiffs' experts attributed the RPT spreads on odd-lot trades in that bond on that date for the smallest odd-lot trade bucket (with trade size of less than or equal to \$50,000) to JP Morgan. That is, if the NAIC database identifies a specific odd-lot trade intermediated by JP Morgan in a particular bond on a particular date, then JP Morgan participated in and was affected by the pricing of all odd-lot RPTs in that bond on that trading day. Therefore, economic theory would predict that JP Morgan would rationally have priced its own trades in line with the overall market, and charged the odd-lot RPT spreads that were customary for each individual bond on each individual trading day. Similarly, if JP Morgan was the dealer on a round lot trade in a particular bond on a particular date, then the spread charged on that transaction would be impacted by all the spreads on round lot RPTs in that bond on that date. However, if there were no trades in that bond by JP Morgan on a specific day, then JP Morgan could not have engaged in RPT pricing for that bond on that trading day, and the RPT spreads were not because of a trade that JP Morgan made for that bond on that date.

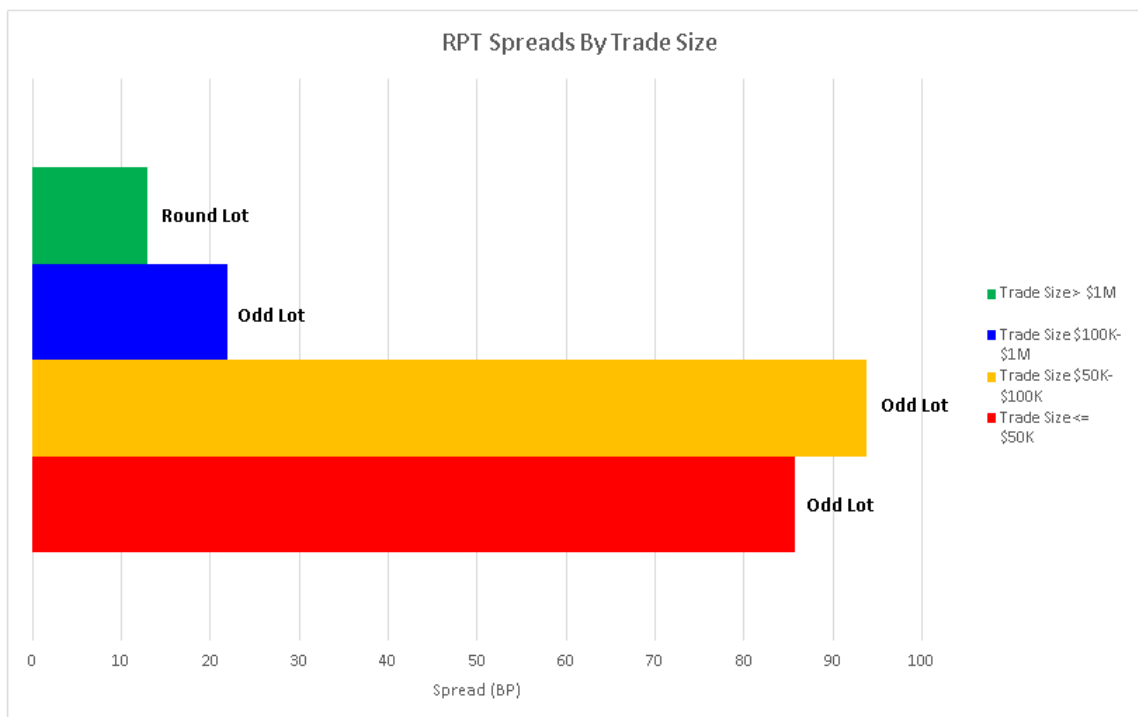
³³ Spreads are not provided in the NAIC database, and therefore, the spreads obtained from TRACE must be matched with dealer identification information from NAIC. This matching methodology has been accepted in peer-reviewed academic publications, such as Paul Asquith *et al.*, *The Market for Borrowing Corporate Bonds*, 107 JOURNAL OF FINANCIAL ECONOMICS, 155-82 (Jan. 2013).

125. This process was repeated individually for each dealer named in each NAIC-reported transaction, in each individual corporate bond, on each date during 2006-2019. It should be noted that this methodology provides a conservative estimate of the extent of Defendants' supra-competitive pricing in the corporate bond market. Dealer identification information is only available for insurance company transactions (from the NAIC database). However, insurance companies, as opposed to retail investors, are relatively sophisticated institutional traders that could use their frequent trading activity to navigate around the opaque market structure resulting from the anti-competitive activity of Defendant banks. Thus, the non-economic RPT spreads for retail traders should be even higher than computed in this analysis.

126. Plaintiffs' experts' analysis found that RPT spreads on transactions implemented by Defendants – over the 2006-2019 time period – exhibited the same pattern of economically and statistically significant differences in spreads for round lot and odd-lot trades observed in the academic studies above. The following chart shows that all Defendants charged an average of 86 basis points for smaller odd-lot RPTs (less than or equal to \$50,000 in size), 94 basis points for odd-lot RPTs ranging from \$50,000 to \$100,000 in size and 22 basis points for odd-lot RPTs from \$100,000 to \$1 million. In contrast, average spreads on round lot RPTs over \$1 million executed by Defendants averaged 13 basis points. Thus, Defendants charged significantly higher spreads for RPT odd-lot transactions than round-lot transactions. These differences are statistically significant (at the 99.999% level), as well as robust to winsorizing to test for the possibility of outliers.

Defendant RPT Analysis, 2006 - 2019

Defendant RPT Average Spreads by Trade Size, 2006 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

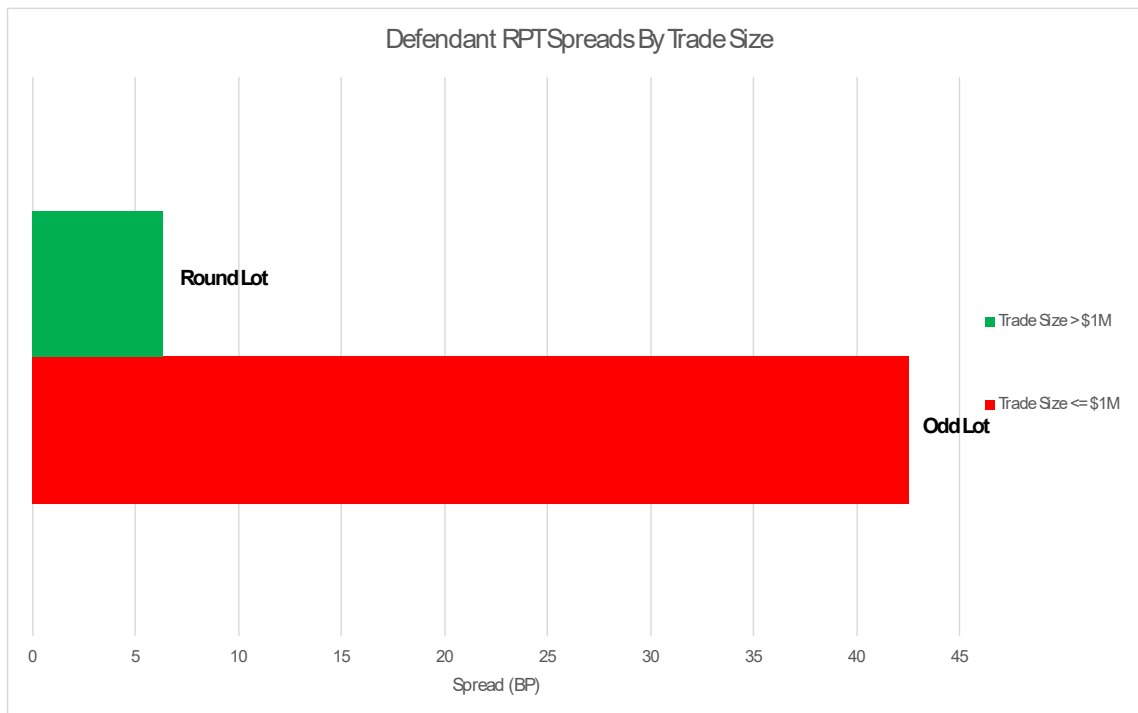
127. The non-economic higher spreads for odd-lot RPTs as compared to round lot RPTs are also found when analyzing individual Defendant dealer banks. The NAIC trades were matched to RPTs from TRACE using two trade size buckets: odd-lot (less than or equal to \$1 million) and round lot (over \$1 million) because the smaller total number of observations obtained using this stricter matching methodology described in paragraph 124 was insufficient to perform the analysis on a bank-by-bank basis.

128. Comparing odd-lot to round lot spreads on all Defendants' RPTs exhibits the same supra-competitive pattern. As the following chart shows spreads on odd-lot RPTs (greater than or equal to \$1 million trade size) averaged 43 basis points as opposed to only 6 basis point for round lot RPTs intermediated by all Defendants. These results are all statistically significant (at the

99.999% level) and robust to winsorizing to test for the possibility of outliers. There is no economic justification for these disparities in RPT spreads.

RPT Analysis, 2006 - 2019

Defendant RPT Average Spreads by Trade Size, 2006 - 2019



Notes & Sources:

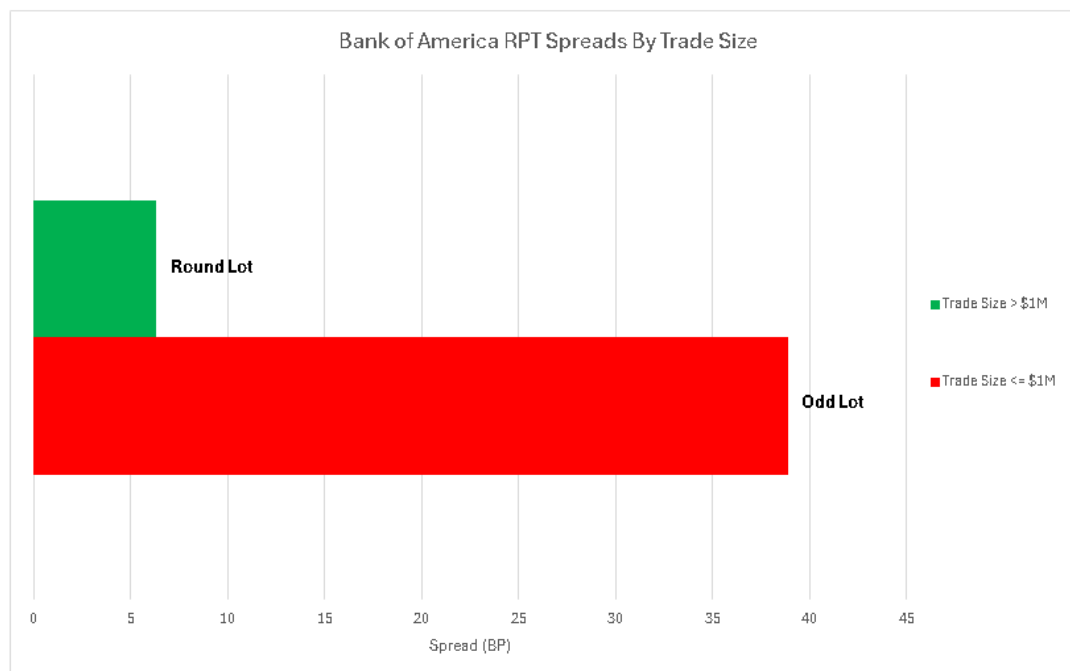
FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

129. Presenting the results for each Defendant bank individually illustrates how pervasive is the extent of Defendants' supra-competitive pricing. The following charts present average spreads for all odd-lot RPTs (with trade size of \$1 million or less) as compared to round-lot RPTs (with trade size over \$1 million) on a bank-by-bank basis. These results are consistent with the aggregate results for all Defendants presented above. The charts below show that the average RPT spreads on odd (round) lot trades were 39 (6) basis points for Bank of America; 32 (4) basis points for Barclays; 33 (5) basis points for Citigroup; 34 (10) basis point for Credit Suisse; 27 (5) basis points for Deutsche Bank; 27 (6) basis points for Goldman Sachs; 27 (6) basis points for JP Morgan Chase; 79 (7) basis points for Morgan Stanley; 27 (4) basis points for RBS; and 45

(12) basis points for Wells Fargo. These results are all statistically significant (at the 99.999% level) and robust to winsorizing to test for the possibility of outliers.

RPT Analysis, 2006 - 2019

Bank of America RPT Average Spreads by Trade Size, 2006 - 2019

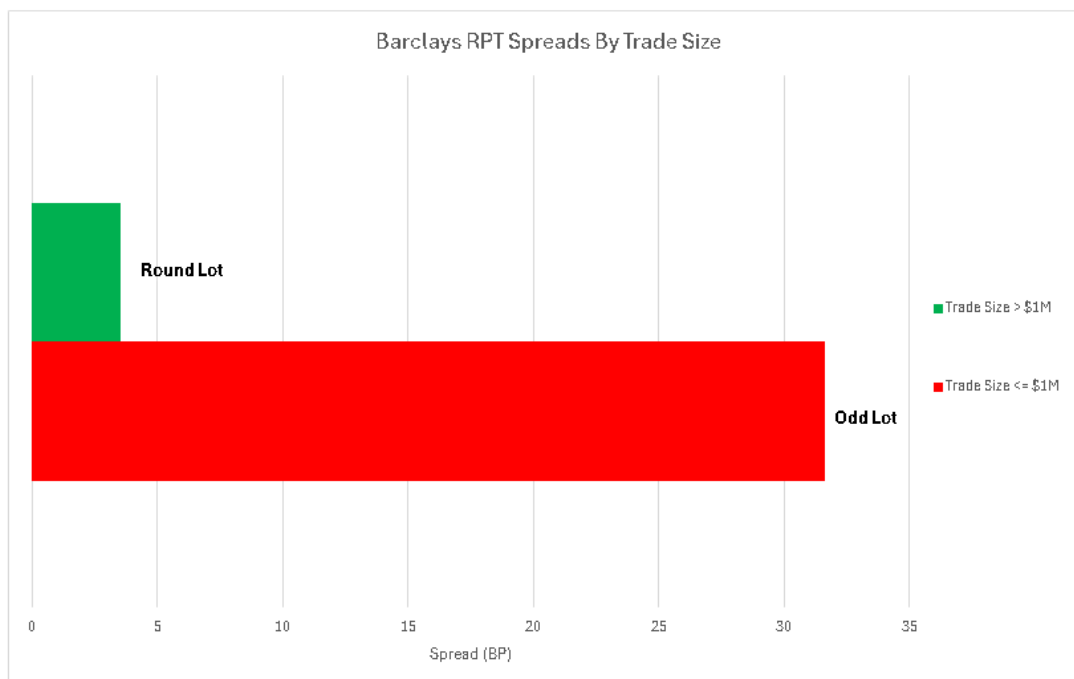


Notes & Sources:

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

RPT Analysis, 2006 - 2019

Barclays RPT Average Spreads by Trade Size, 2006 - 2019

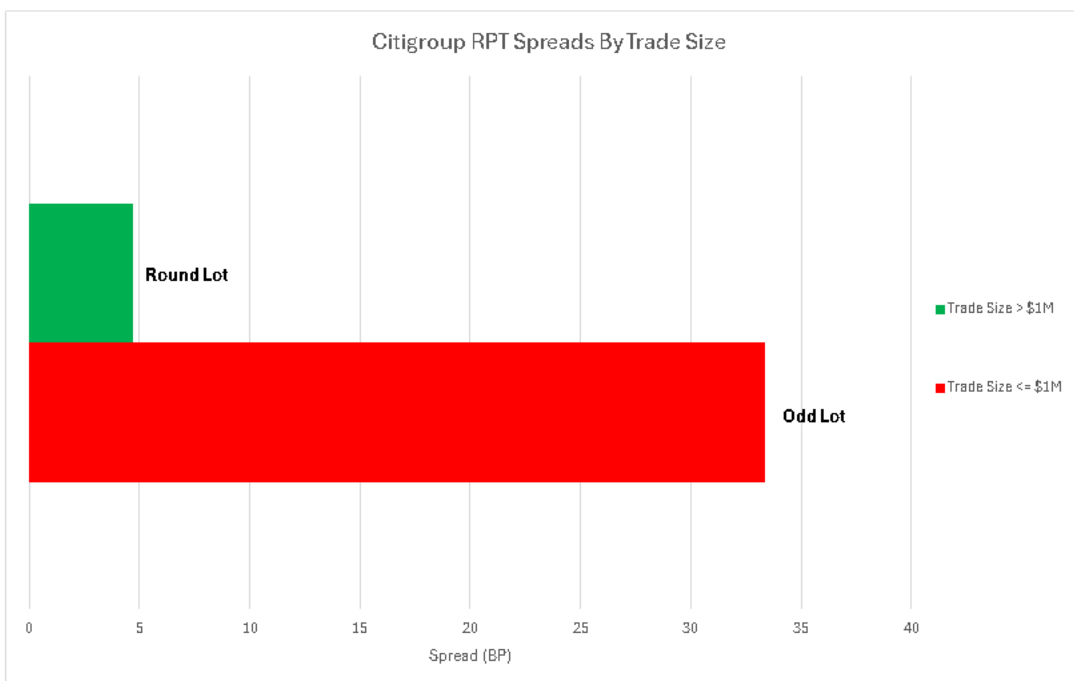


Notes & Sources:

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

RPT Analysis, 2006 - 2019

Citigroup RPT Average Spreads by Trade Size, 2006 - 2019

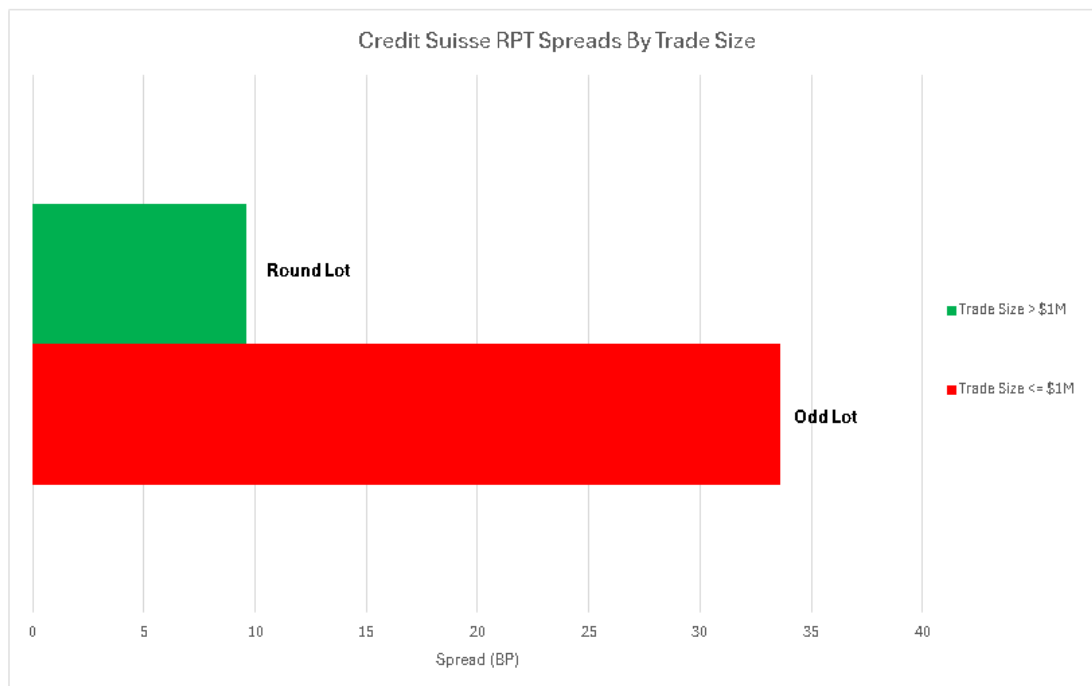


Notes & Sources:

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

RPT Analysis, 2006 - 2019

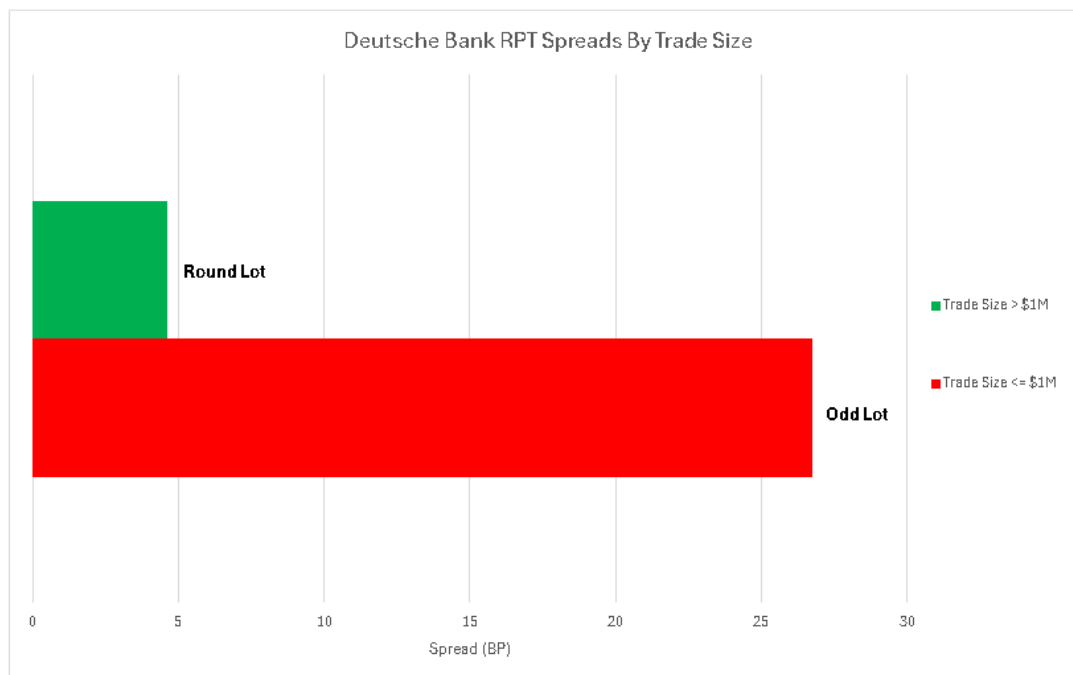
Credit Suisse RPT Average Spreads by Trade Size, 2006 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

RPT Analysis, 2006 - 2019

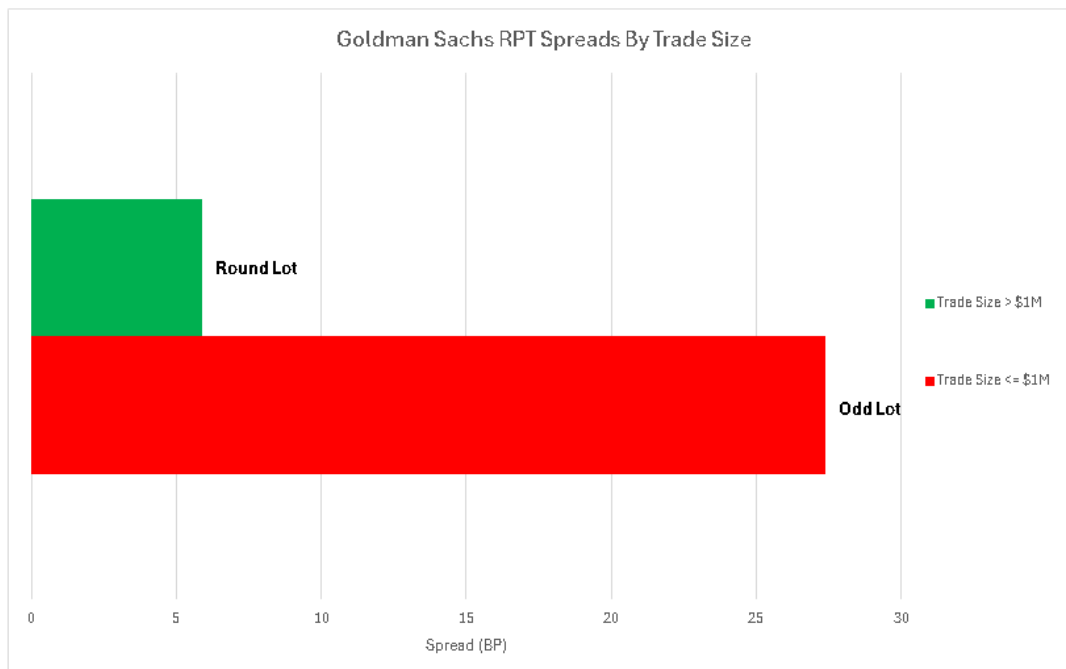
Deutsche Bank RPT Average Spreads by Trade Size, 2006 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

RPT Analysis, 2006 - 2019

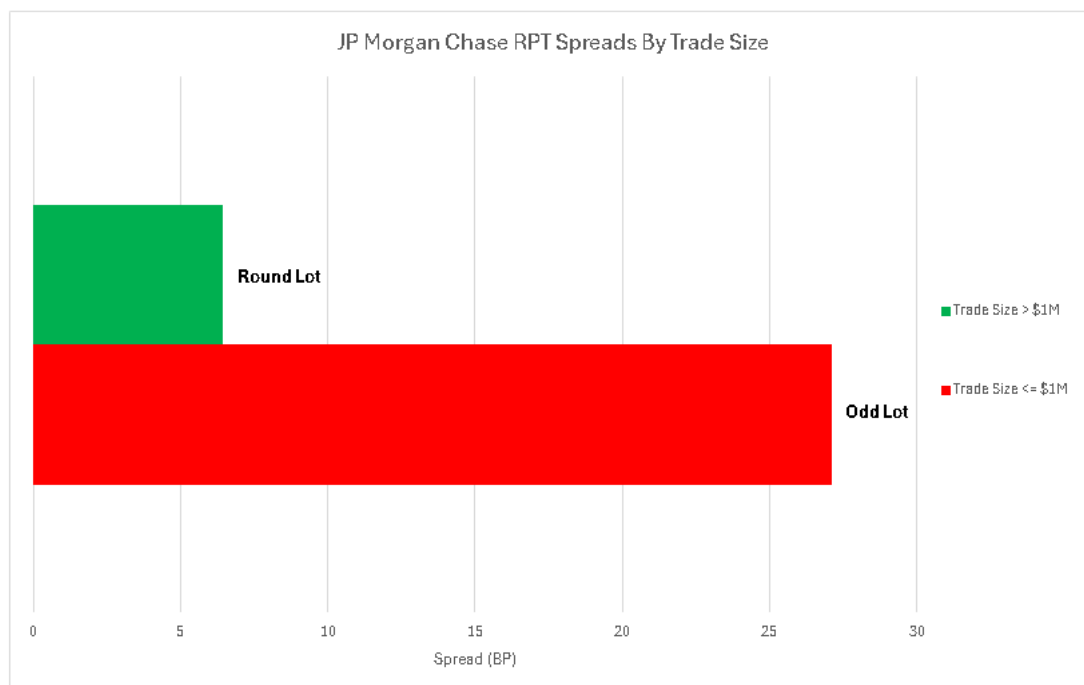
Goldman Sachs RPT Average Spreads by Trade Size, 2006 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

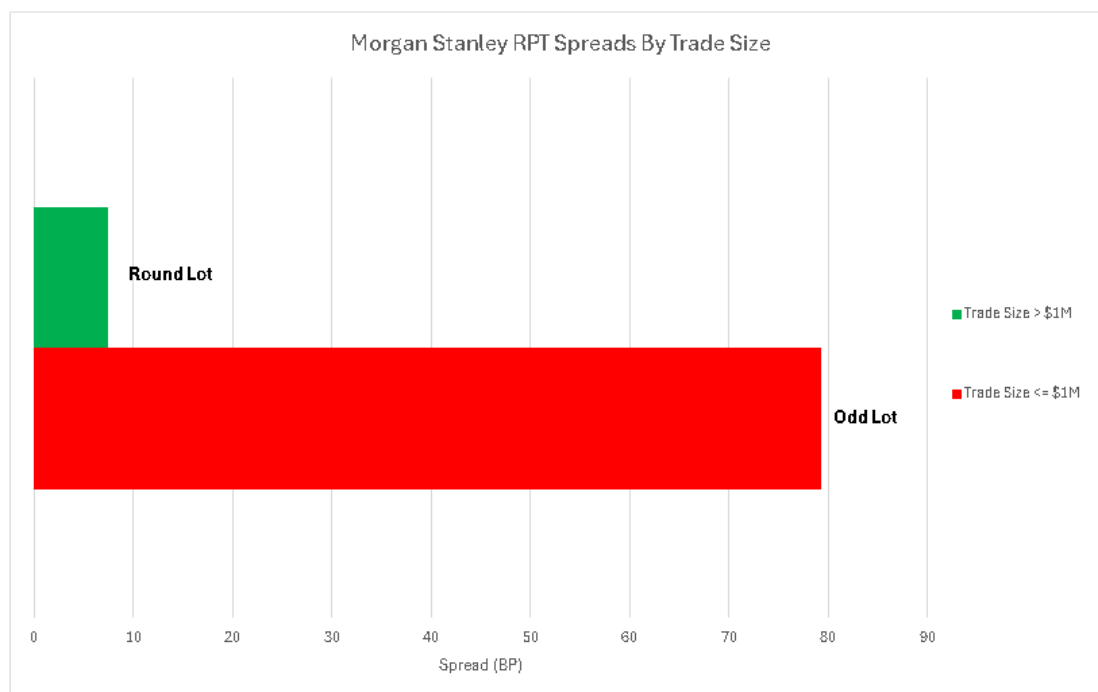
RPT Analysis, 2006 - 2019

JP Morgan Chase RPT Average Spreads by Trade Size, 2006 - 2019

**Notes & Sources:**

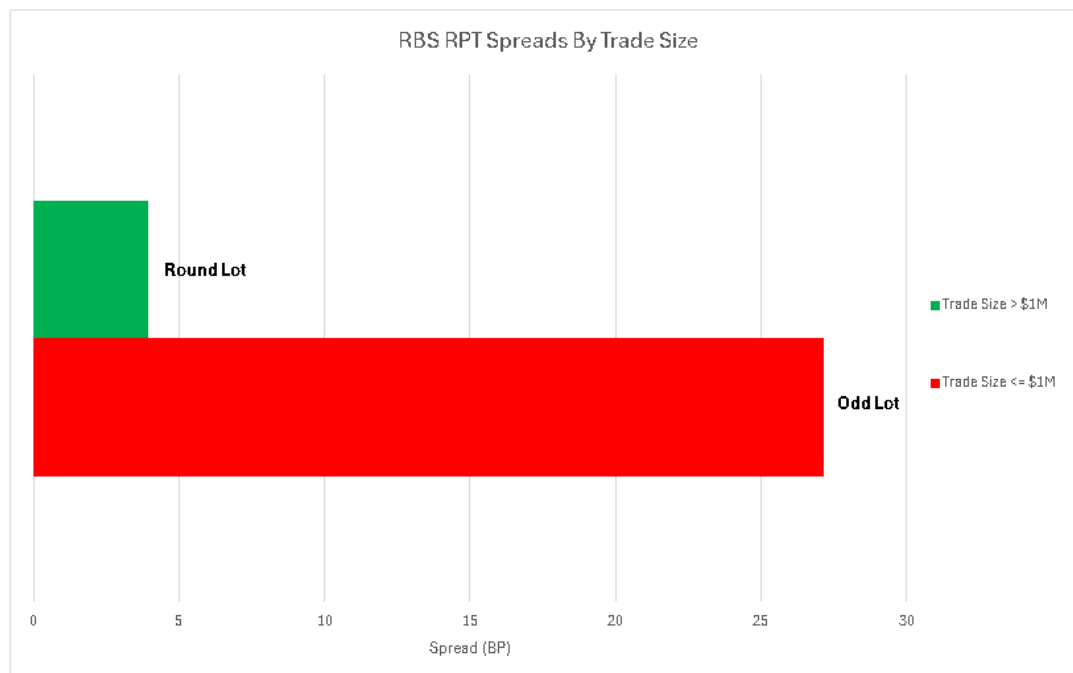
FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

RPT Analysis, 2006 - 2019

Morgan Stanley RPT Average Spreads by Trade Size, 2006 - 2019**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

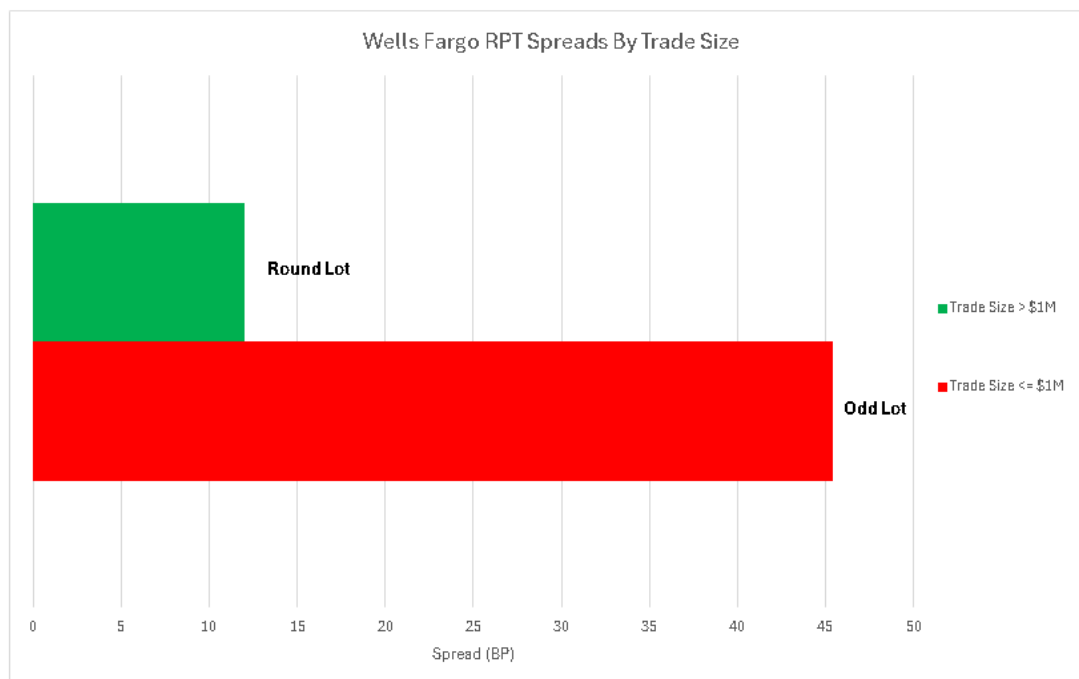
RPT Analysis, 2006 - 2019

RBS RPT Average Spreads by Trade Size, 2006 - 2019**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

RPT Analysis, 2006 - 2019

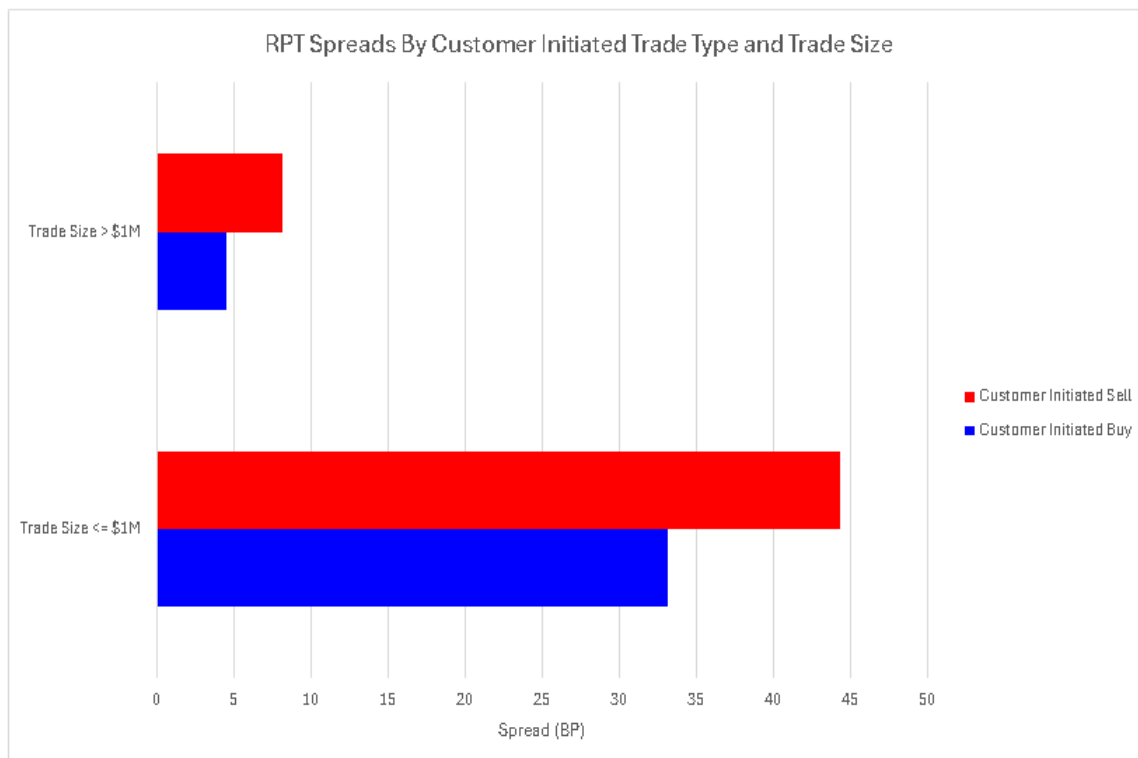
Wells Fargo RPT Average Spreads by Trade Size, 2006 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

130. Further, Plaintiffs' experts examined RPT spreads comparing customer-initiated buys to customer-initiated sells for each Defendant dealer. As shown in the following charts for each Defendant dealer, odd-lot RPT spreads are substantially higher than RPT spreads for round lot RPTs for both customer-initiated sales and purchases. These results are all statistically significant (at the 99.999% level) and robust to winsorizing to test for the possibility of outliers.

RPT Analysis, 2006 - 2019

Bank of America RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

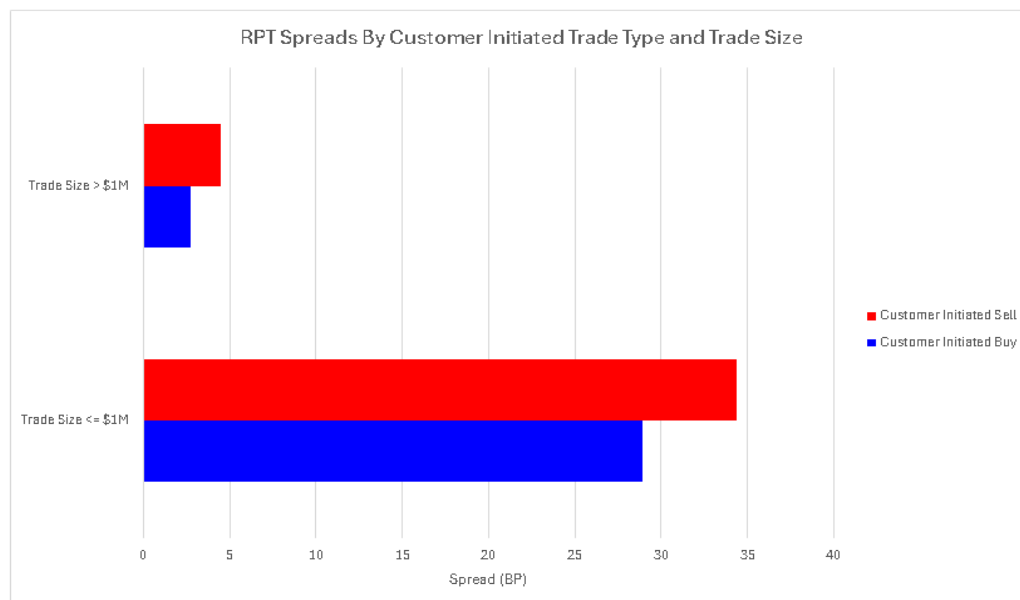
Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

RPT Analysis, 2006 - 2019

Barclays RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

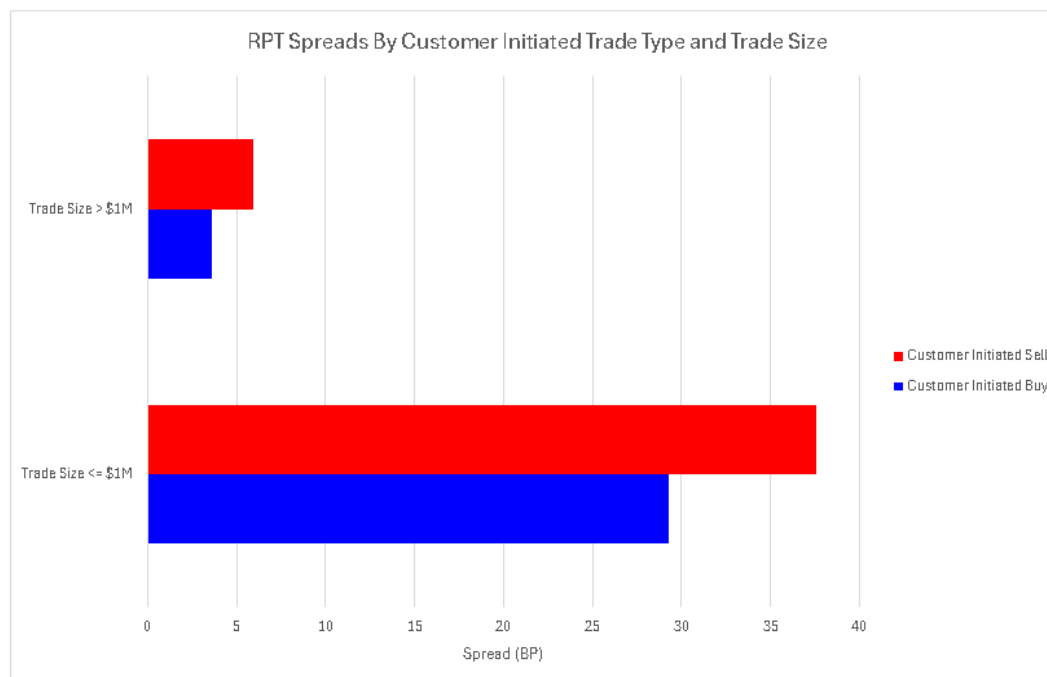
Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

RPT Analysis, 2006 - 2019

Citigroup RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019

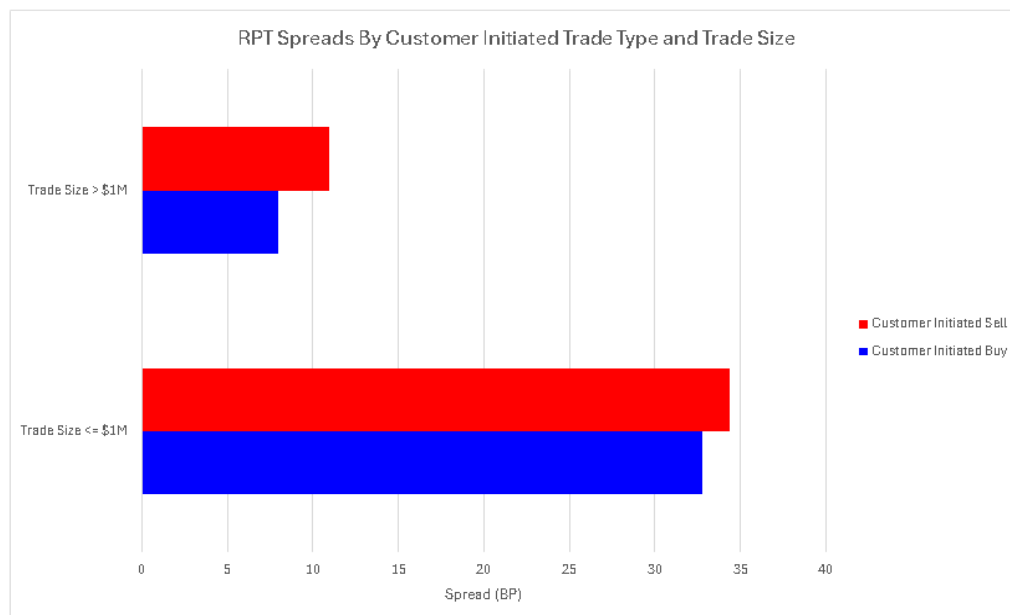
**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

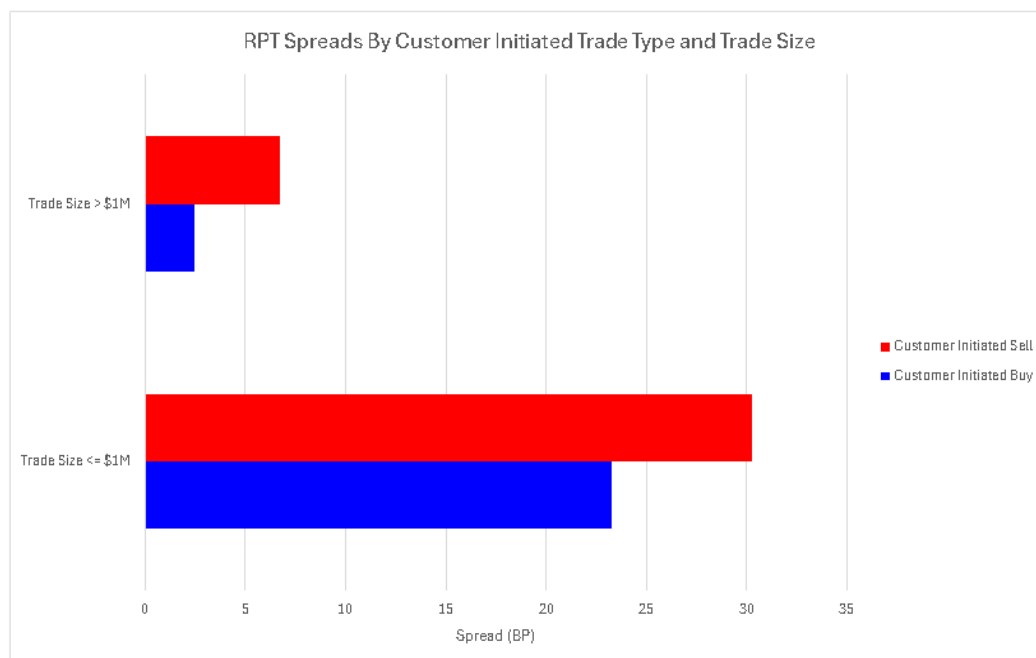
RPT Analysis, 2006 - 2019**Credit Suisse RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019****Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

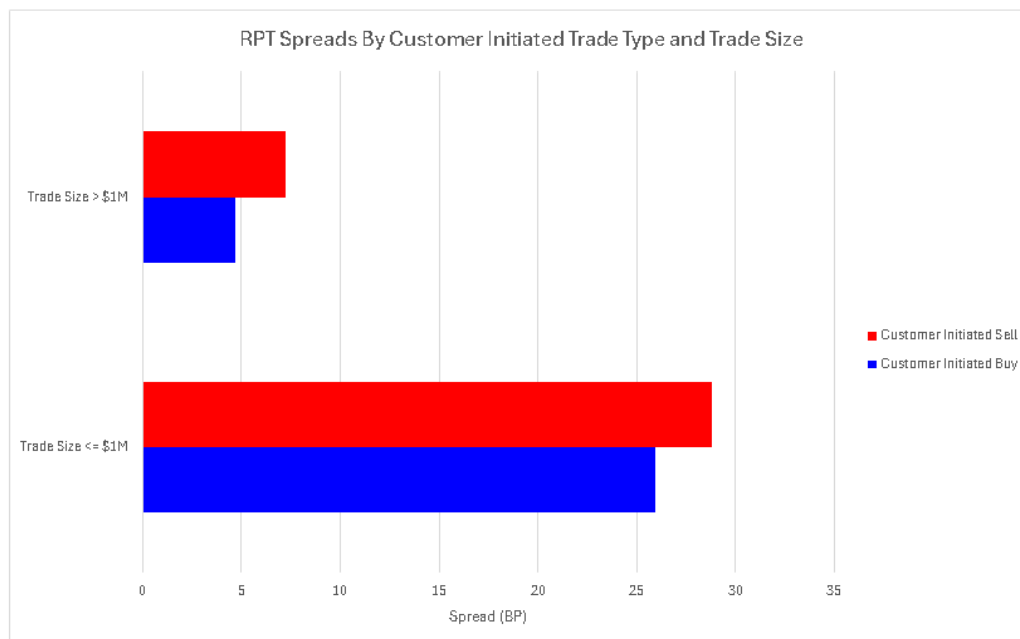
RPT Analysis, 2006 - 2019**Deutsche Bank RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019****Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

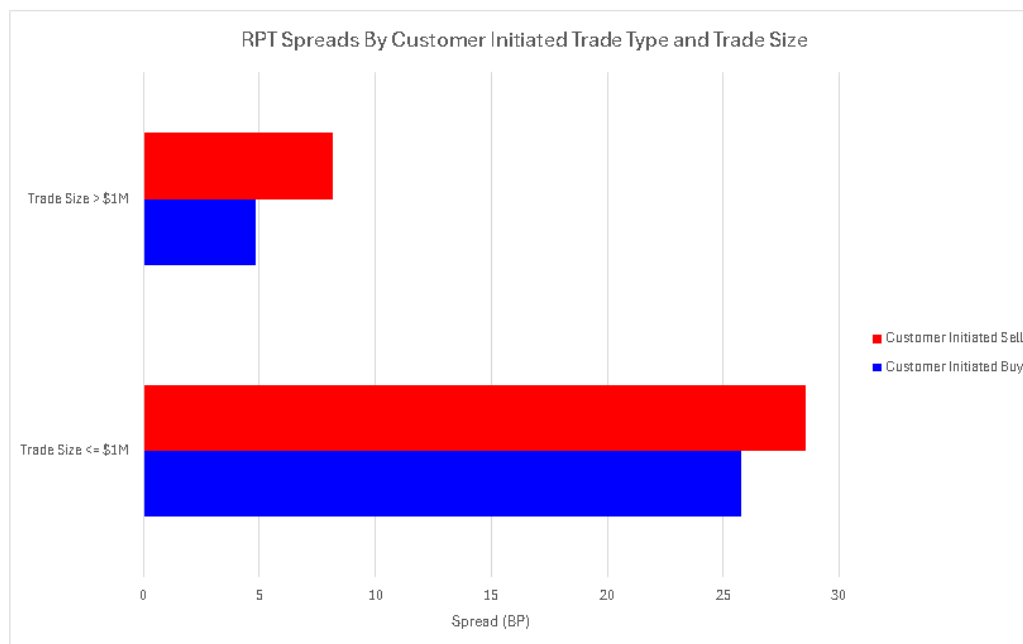
RPT Analysis, 2006 - 2019**Goldman Sachs RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019****Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

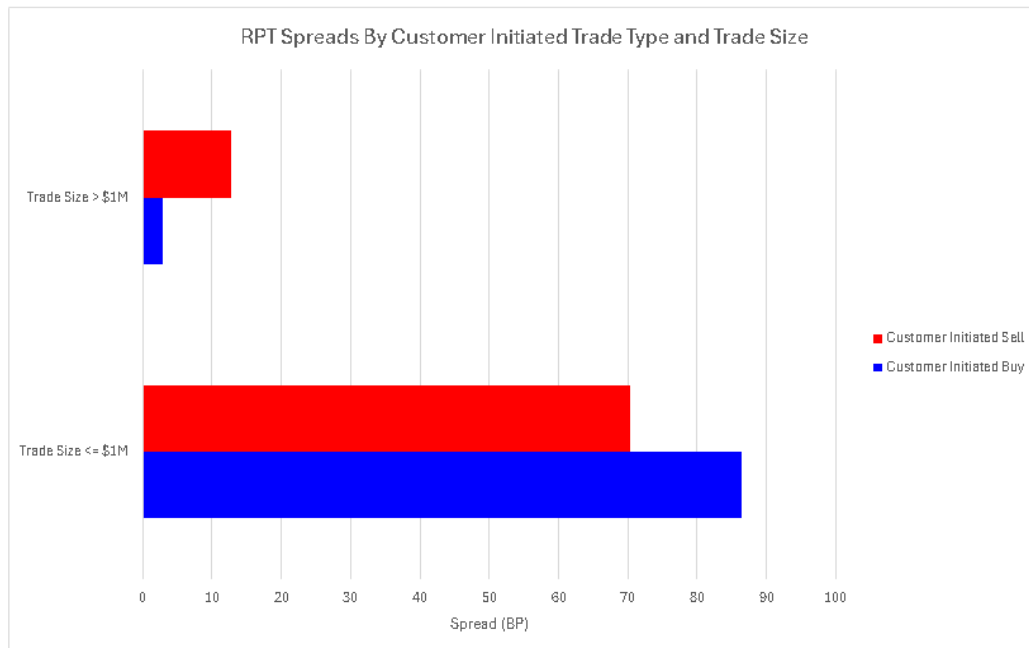
RPT Analysis, 2006 - 2019**JP Morgan Chase RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019****Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

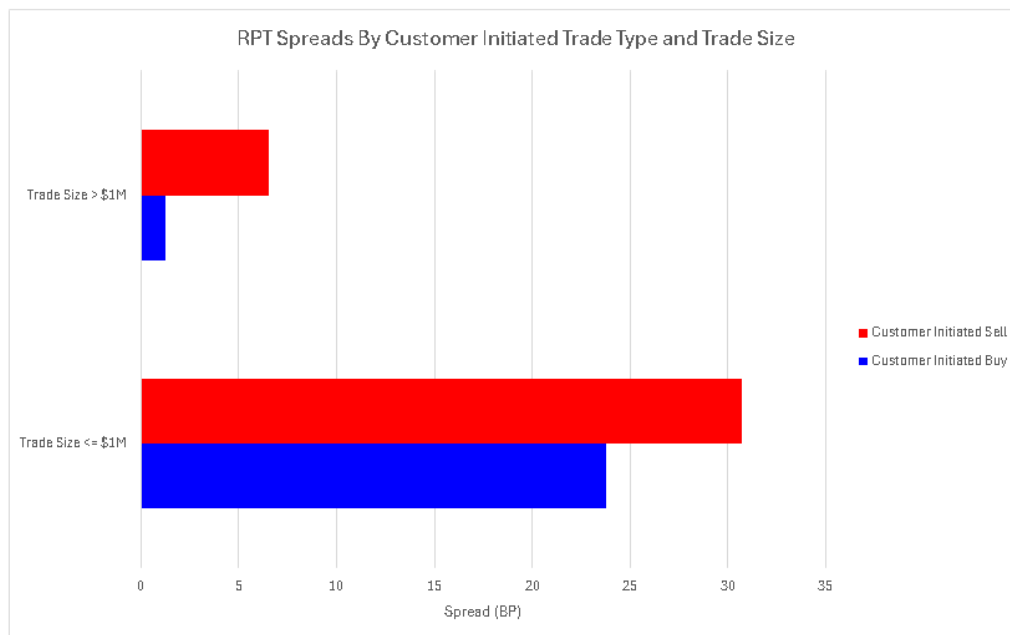
RPT Analysis, 2006 - 2019**Morgan Stanley RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019****Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

RPT Analysis, 2006 - 2019**RBS RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019****Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

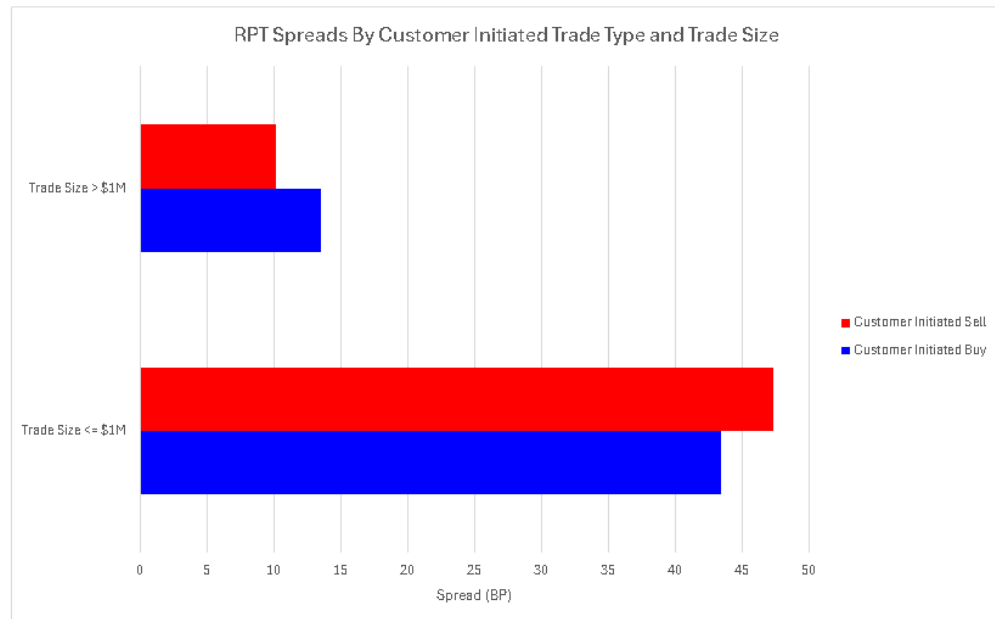
Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

RPT Analysis, 2006 - 2019

Wells Fargo RPT Average Spreads by Customer Initiated Trade Type (Buy vs. Sell) and Trade Size, 2006 - 2019

**Notes & Sources:**

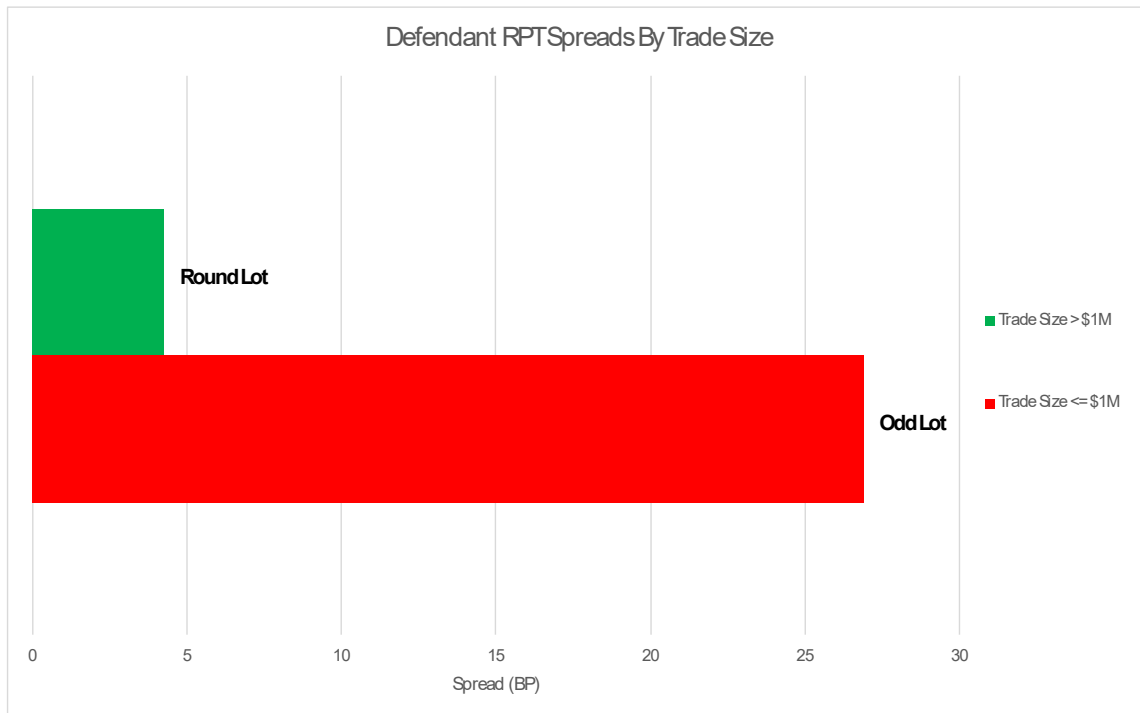
FINRA's Enhanced TRACE bond trading data, 2006 - 2019. NAIC Schedule D Part 3 data for the period 2006 - 2019.

Definitions of field headers:

Customer Initiated Sell: These are RTPs where the customer initiated the RPT with a sell order.

Customer Initiated Buy: These are RTPs where the customer initiated the RPT with a buy order.

131. Plaintiffs' experts also performed the RPT analysis for individual Defendant dealers over the four year 2016-2019 statutory period alleged by Defendants. Aggregating all Defendants resulted in an average spread on odd-lot RTPs of 27 basis points as compared to four basis points for round lot RTPs, as shown below. These results are all statistically significant (at the 99.999% level) and robust to winsorizing to test for the possibility of outliers.

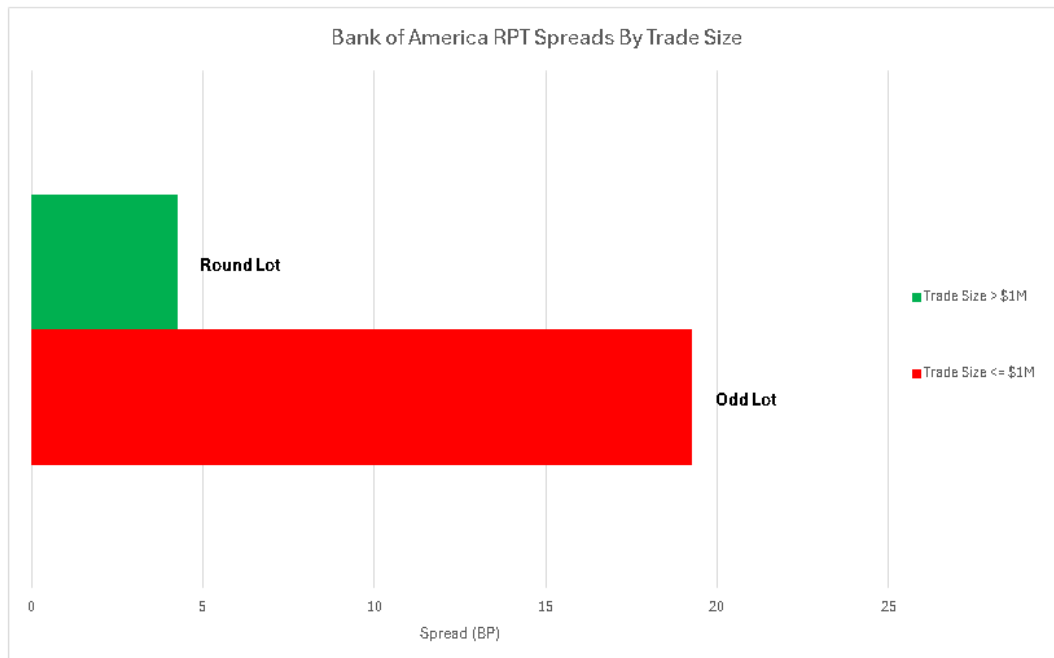
RPT Analysis, April 21, 2016 - 2019**Defendant RPT Average Spreads by Trade Size, April 21, 2016 - 2019****Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

132. These same supra-competitive RPT spreads are observed on odd-lot trades for each of the Defendants individually. As shown in the following charts, during 2016-2019, the average RPT spreads on odd (round) lots were 19 (4) basis points for Bank of America; 29 (3) basis points for Barclays; 26 (5) basis points for Citigroup; 27 (6) basis point for Credit Suisse; 24 (6) basis points for Deutsche Bank; 23 (5) basis points for Goldman Sachs; 24 (4) basis points for JP Morgan Chase; 37 (4) basis points for Morgan Stanley; 15 basis points (no round lot trades) for RBS; and 32 (3) basis points for Wells Fargo. These results are all statistically significant (at the 99.999% level) and robust to winsorizing to test for the possibility of outliers.

RPT Analysis, April 21, 2016 - 2019

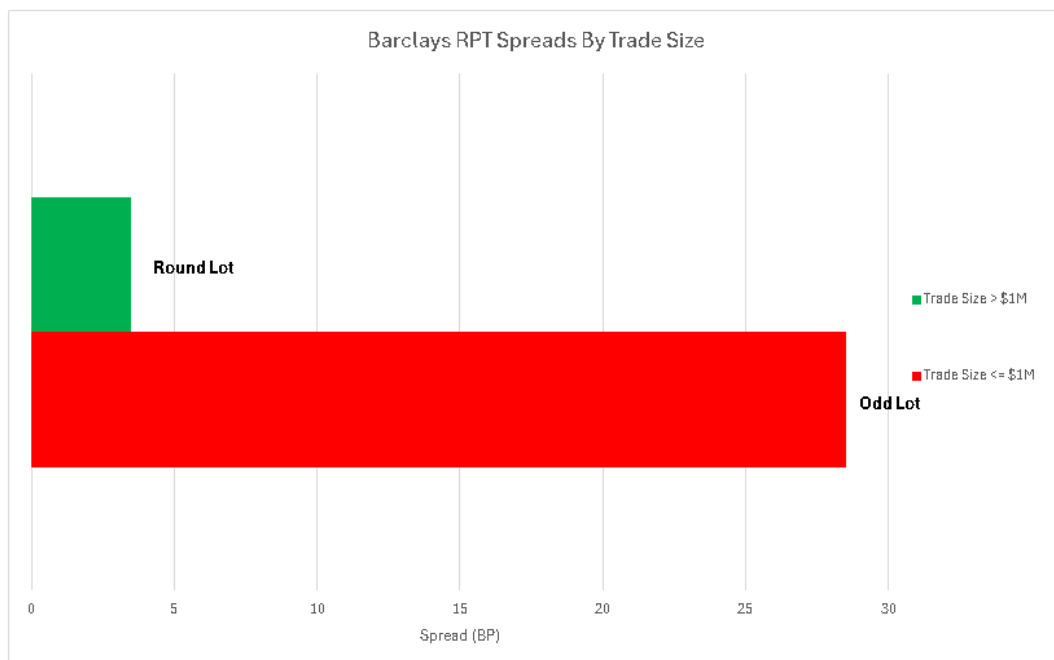
Bank of America RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

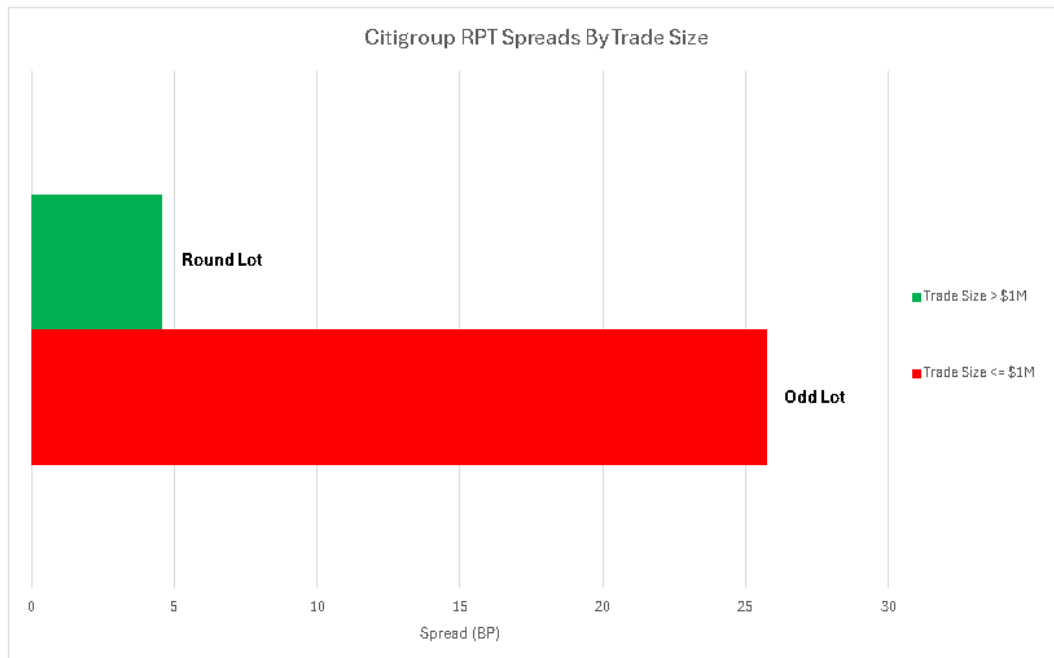
Barclays RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

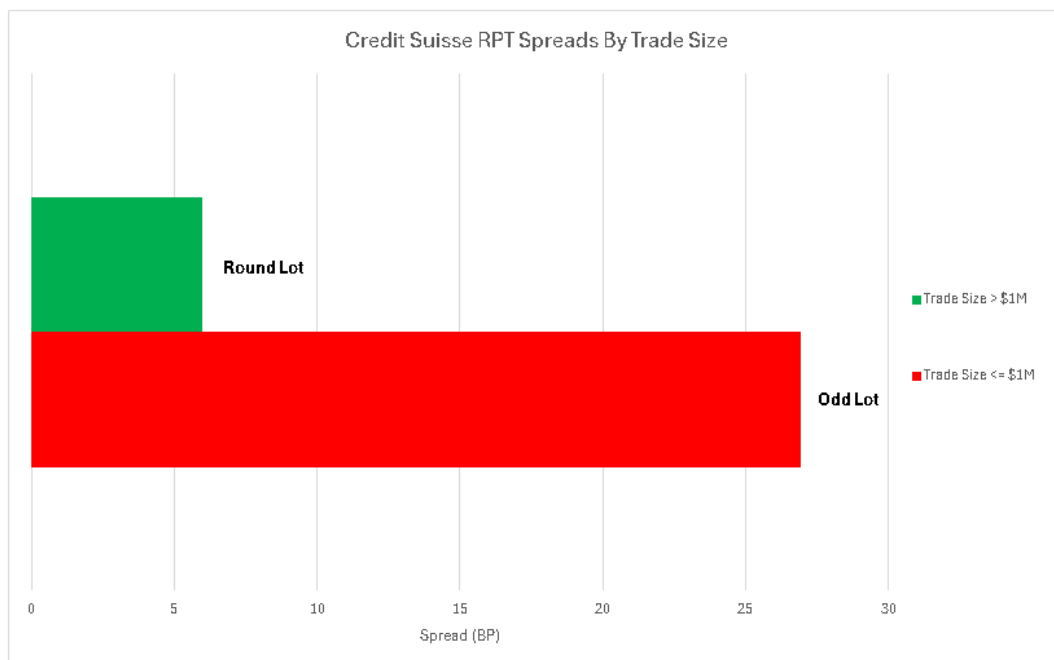
Citigroup RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

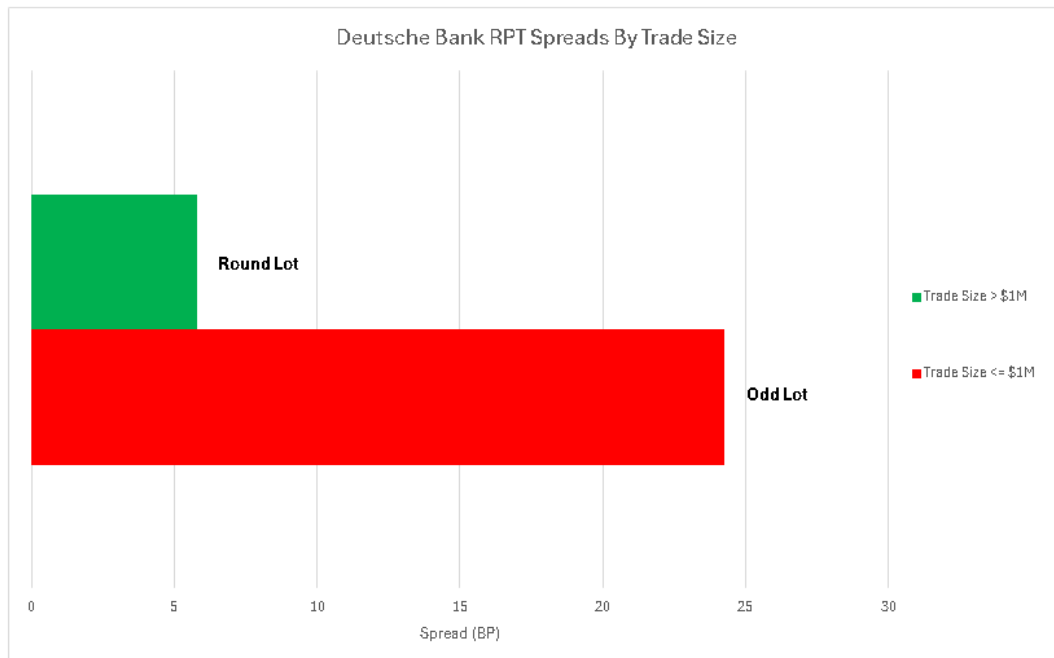
Credit Suisse RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

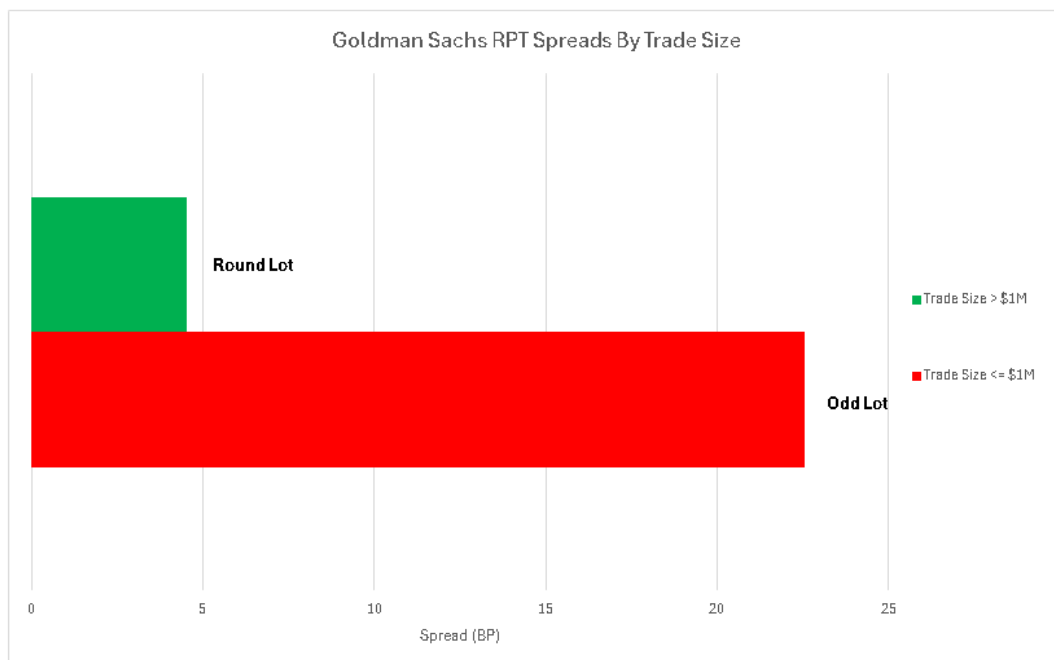
Deutsche Bank RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

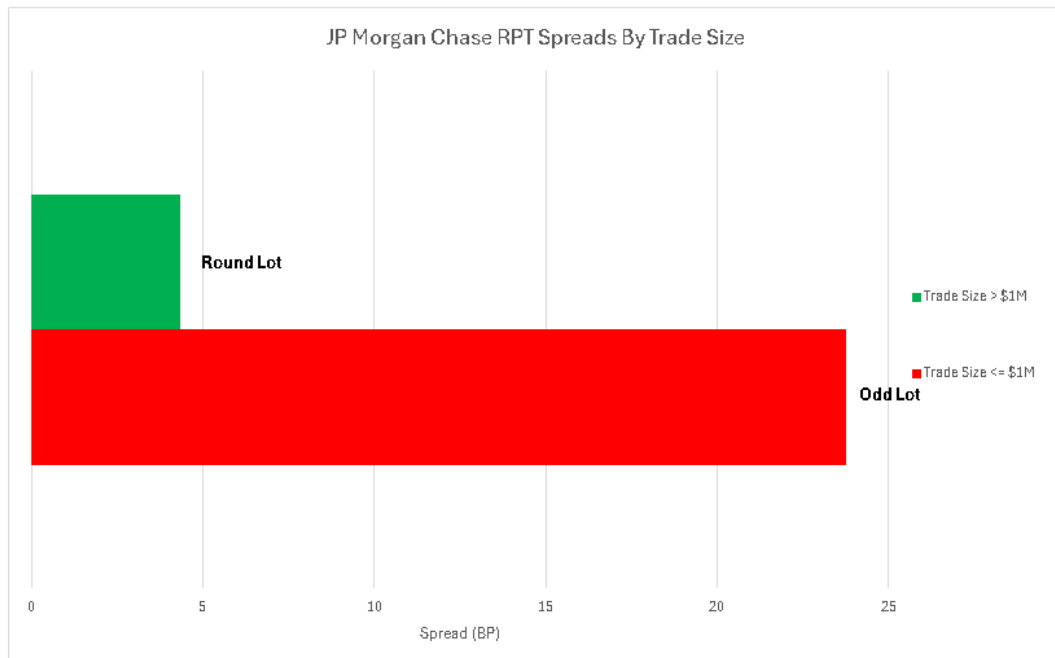
Goldman Sachs RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

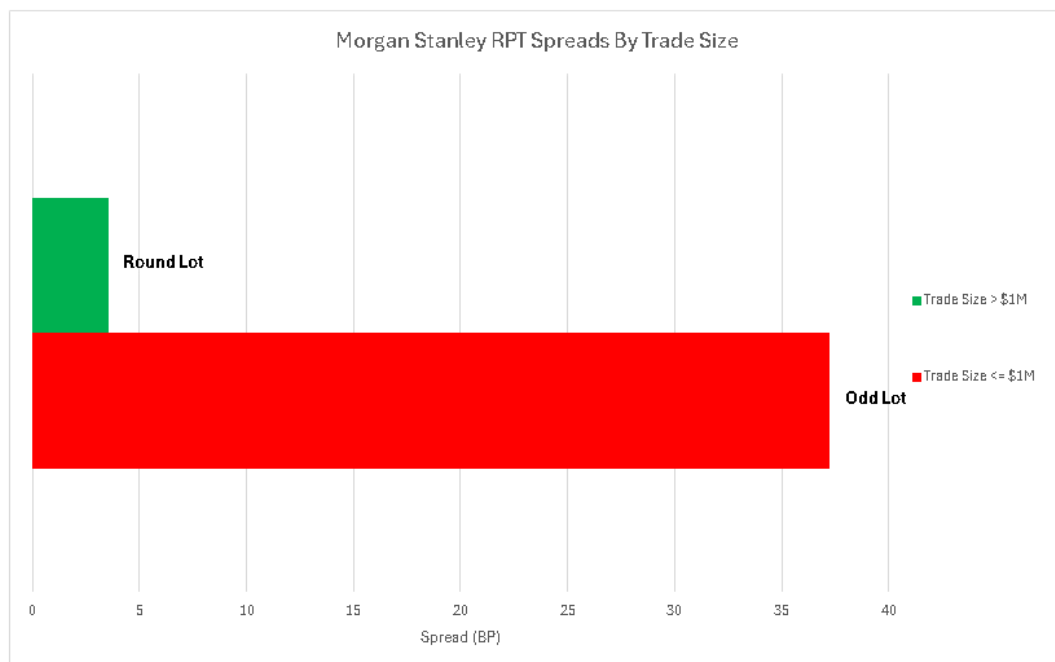
JP Morgan Chase RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

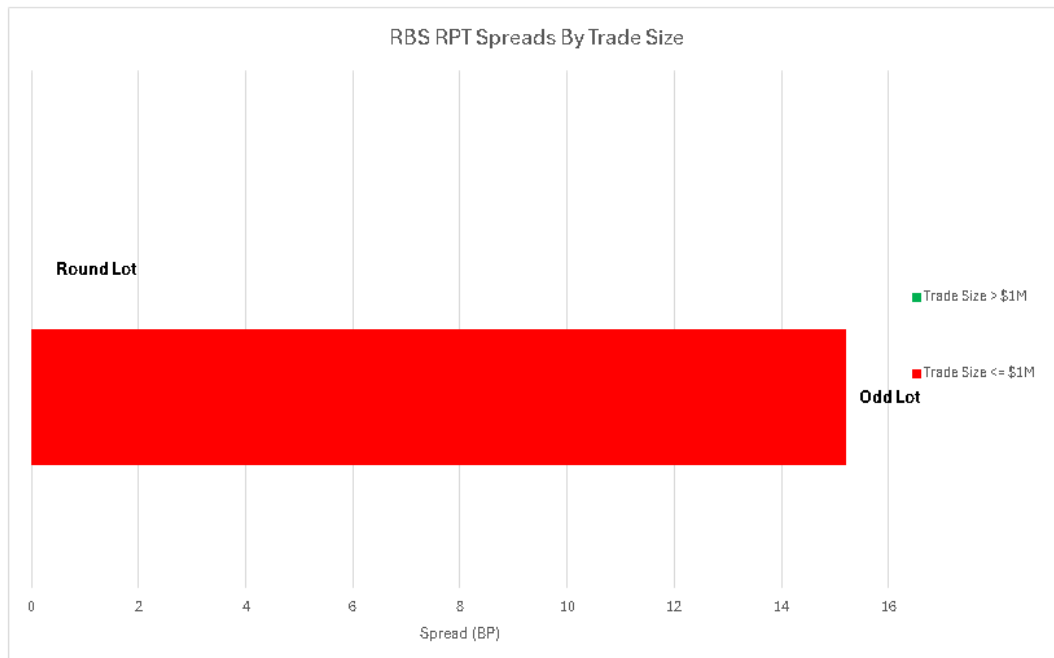
Morgan Stanley RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

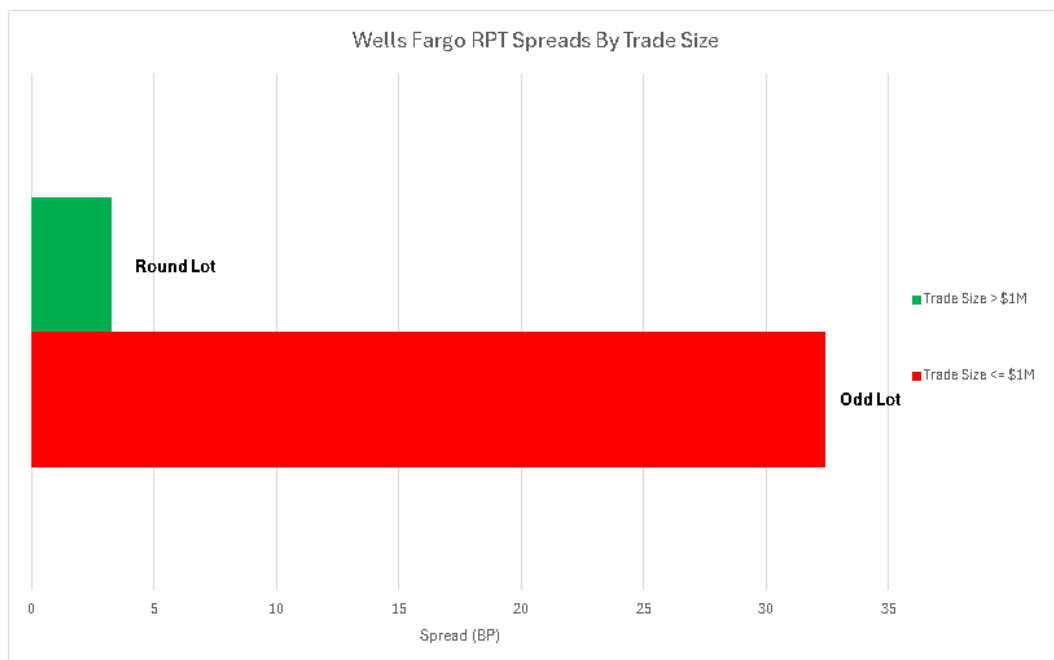
RBS RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

RPT Analysis, April 21, 2016 - 2019

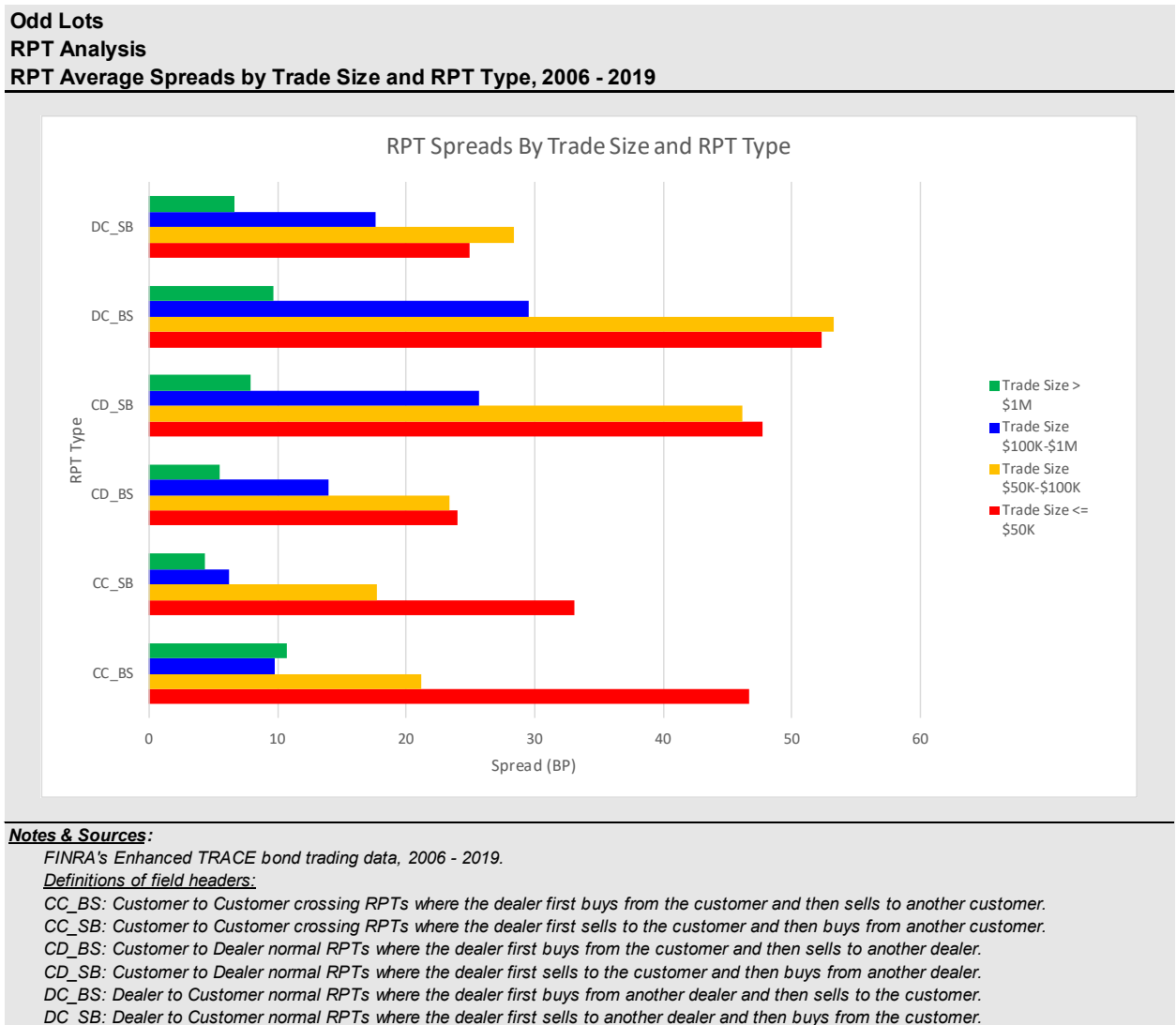
Wells Fargo RPT Average Spreads by Trade Size, April 21, 2016 - 2019

**Notes & Sources:**

FINRA's Enhanced TRACE bond trading data, April 21, 2016 - 2019. NAIC Schedule D Part 3 data for the period April 21, 2016 - 2019.

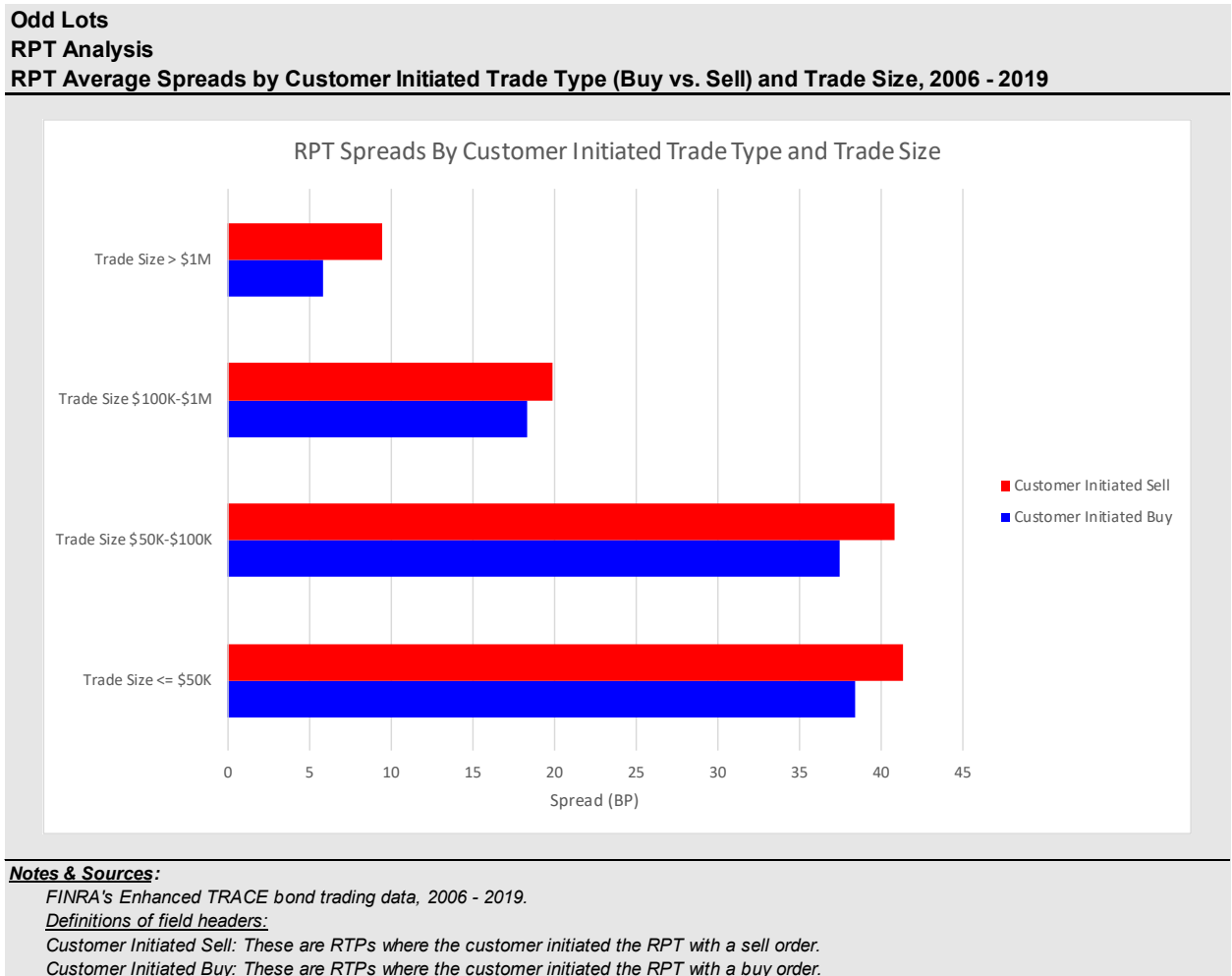
4. RPT Analysis Shows that Spreads for Odd-Lot Trades Are Wider than Round Lots Regardless of RPT Type

133. Consistent with Defendants' thwarting competition in the Relevant Market, the economic analysis of Riskless Principal Trades found economically and statistically significantly wider spreads for odd-lot RPTs when compared to round lot RPTs regardless of RPT type. The different types relate to timing and sequencing of the trades, which are described at the bottom of the chart, which summarizes these results.



134. The RPT analysis further shows that spreads for customer-initiated sales are wider for odd-lots as compared to round-lot trades. The following chart shows that odd-lot RPT sales

initiated by customers have spreads that are statistically and economically wider than all other trade types. These results are statistically significant (at the 99.999% level) and robust to winsorizing to test for the possibility of outliers.



5. Each Defendant Obtained Significantly Lower Execution Prices for Customer-Initiated Sales of Odd-Lots vs. Round Lots

135. The second analysis performed by Plaintiffs' expert measures the quality of execution of the trades by Defendant dealers on behalf of odd-lot investors. Prices obtained for the execution of customer-initiated odd-lot trades are compared to benchmark prices on round-lot transactions in the same bond at the same time. Odd-lot investors are damaged by Defendant dealers who obtain lower prices for customer-initiated odd-lot sales (thereby reducing odd-lot

investor proceeds) and higher prices for customer-initiated odd-lot buys (raising odd-lot investor costs) as compared to available prices in the market for equivalent trades of larger size.

136. The results of this second expert analysis indicate that Defendants took advantage of customer-initiated odd-lot sales by obtaining statistically and economically significantly (at the 99.999% level) lower execution prices for their clients than were concurrently available for round lot sales of the same bonds. The analysis shows that *each Defendant* paid investors prices for customer-initiated odd-lot sales that were statistically and economically significantly lower than the prices they paid for round lot sales of the same bonds on the same date.

137. Using NAIC data that identifies the dealer executing each trade, Plaintiffs' experts examined the prices paid by Defendants for odd-lot sales by insurance companies. They compared each of those prices for each customer-initiated odd-lot sale to the average of all round lot sales trade prices in the same bond on the same date. The following Table shows that for odd-lot sales by insurance companies to Defendants over the 2006-2019 period, Defendants obtained prices that were an average of almost 61 basis points below round lot average prices, with a 98.4 basis point median markdown. These economically and statistically significant (at the 99.99% level) price markdowns for customer-initiated odd-lot sales directly harmed insurance companies selling odd-lots because they received lower prices for their bonds. All results were adjusted to eliminate outliers.³⁴

³⁴ To address any concerns about the use of average round-lot benchmark prices, Plaintiffs' experts also used the median round-lot benchmark price in the same bond on the same date. Comparing this price to the actual price received by Defendants' odd-lot insurance company bond sellers results in a markdown of 60.6 basis points on average, with a median markdown of 98.9 basis points. These results are economically and statistically significant, as well as adjusted to eliminate outliers.

<u>No. of Trades</u>	<u>Average Defendant Non- Competitive Markdown (bp)</u>	<u>Median Defendant Non- Competitive Markdown (bp)</u>
36,545	60.4	98.4
<p><u>Notes & Sources:</u> FINRA's Enhanced TRACE bond trading data, NAIC Schedule D Part 4. <i>The non-competitive markdown is calculated as the difference between the price obtained by Defendants on customer-initiated odd lot sales as compared to average round-lot sales prices for the same bond on the same date.</i></p>		

138. The breakdown of non-competitive markdowns by Defendant is shown in the following Table. Over the 2006-2019 period, each Defendant obtained economically and statistically significantly (at the 99.9% level) lower prices to their insurance-company customers selling odd-lots as compared to round lot sales of the same bond on the same date. The price markdowns range from 27.3 (Goldman Sachs) to 154.4 (RBS/NatWest) basis points for the average customer-initiated odd-lot sale. All of these differences economically and statistically significant (at the 99.999% level) and are adjusted to remove outliers. It should be noted that this analysis represents a subset of all potentially non-competitive markdowns since the NAIC database is limited to corporate bond transactions undertaken by insurance companies. This analysis also stands as a lower bound damages imposed by dealer Defendants on investors, because the analysis involves insurance-company clients, which are relatively sophisticated investors. To put it another way, insurance companies are institutional investors, and they are likely to receive better pricing than retail customers. Yet, the analysis shows that the Defendant dealers can force even repeat players, such as insurance companies, to pay supracompetitive spreads on odd-lots trades. The power of Defendant dealers to engage in non-competitive pricing stems from the absence of pre-trade price transparency in the dealer-dominated, opaque U.S. corporate bond market and damages even sophisticated institutional odd-lot investors.

Defendant	No. of Trades	Average Defendant Non- Competitive Markdown (bp)	Median Defendant Non- Competitive Markdown (bp)
Bank of America	6,594	50.3	75.0
Barclays	4,096	83.7	137.5
Citigroup	3,760	51.4	81.2
Credit Suisse	3,152	39.5	69.3
Deutsche Bank	2,400	44.4	75.0
Goldman Sachs	4,130	27.3	46.9
JP Morgan Chase	4,895	55.7	97.0
Morgan Stanley	4,049	52.8	92.2
RBS / NatWest	192	154.4	300.0
Wells Fargo	3,277	146.2	208.1

Notes & Sources:

FINRA's Enhanced TRACE bond trading data, NAIC Schedule D Part 4.

6. Economic Analysis of a Sample of Plaintiffs' Trades Demonstrates Defendants Consistently Charged Plaintiffs Higher Transaction Costs for Odd-Lots Trades

139. Comparing the sales price obtained by Defendant dealers for Plaintiffs' odd-lot sales to average sales prices for round lot sales of the same security on the same day illustrates how Defendants' anticompetitive behavior harms Plaintiffs. The following Table shows 38 individual examples of losses incurred by Plaintiff UFCW on its odd-lot sales executed by Defendants. In these examples, UFCW received lower prices on odd-lot sales executed by Defendants as compared to the average prices that were available to round lot sellers in the same security on the same date. These price markdowns are statistically and economically significant and show UFCW's injury. The Table below shows that UFCW realized sales proceeds totaling \$4,257,701 on these 38 trades. However, if UFCW had received higher round lot sales prices, sales proceeds would have totaled \$4,261,717. Thus, UFCW lost \$4,016 on these 38 trades alone. Notably, these examples represent a small portion of the potential impact on Plaintiffs given the

limitations of obtaining matches between Plaintiffs' trades and the NAIC data which contain dealer information, but only apply to insurance company transactions.

Plaintiff	Trade Date	CUSIP	Defendant Name	Actual Sale Proceeds	Round Lot Sale Proceeds	Loss to Plaintiff (\$)
UFCW	1/11/2007	842587AB3	Barclays	\$449,496	\$449,640	\$144
UFCW	12/3/2013	594918AV6	JP Morgan Chase	\$54,683	\$54,713	\$30
UFCW	1/14/2014	89236TBB0	Deutsche Bank	\$214,817	\$214,987	\$170
UFCW	4/4/2016	29379VBK8	JP Morgan Chase	\$159,837	\$159,971	\$134
UFCW	4/20/2016	38141GVU5	Goldman Sachs	\$159,896	\$160,338	\$442
UFCW	5/5/2016	822582BR2	Barclays	\$149,667	\$149,675	\$8
UFCW	5/23/2016	512807AR9	JP Morgan Chase	\$29,975	\$30,030	\$55
UFCW	5/25/2016	94988J5D5	Wells Fargo	\$249,893	\$250,000	\$107
UFCW	6/2/2016	00817YAU2	Citigroup	\$139,986	\$140,219	\$233
UFCW	6/29/2016	68389XBK0	JP Morgan Chase	\$139,756	\$140,166	\$410
UFCW	7/12/2016	20030NBV2	Citigroup	\$139,861	\$139,958	\$96
UFCW	7/18/2016	949746SA0	Wells Fargo	\$124,883	\$124,974	\$91
UFCW	7/27/2016	92343VDG6	Deutsche Bank	\$174,237	\$174,434	\$197
UFCW	8/4/2016	446150AK0	Goldman Sachs	\$49,925	\$50,033	\$108
UFCW	8/5/2016	577081BA9	Bank of America	\$45,041	\$45,043	\$1
UFCW	8/9/2016	26441CAR6	Barclays	\$69,993	\$70,033	\$40
UFCW	8/10/2016	031162CG3	Citigroup	\$89,902	\$89,928	\$26
UFCW	8/29/2016	13607RAB6	Citigroup	\$84,985	\$85,010	\$26
UFCW	9/7/2016	822582BW1	Goldman Sachs	\$144,497	\$144,521	\$24
UFCW	12/8/2016	38145GAJ9	Goldman Sachs	\$59,955	\$59,969	\$14
UFCW	1/4/2017	89236TDP7	Citigroup	\$94,872	\$94,908	\$36
UFCW	1/17/2017	949746SK8	Wells Fargo	\$5,000	\$5,001	\$1
UFCW	1/23/2017	38141GWC4	Goldman Sachs	\$74,760	\$74,799	\$39
UFCW	1/31/2017	00206RDN9	Citigroup	\$149,886	\$150,029	\$143
UFCW	2/13/2017	38141GWC4	Goldman Sachs	\$19,942	\$19,953	\$10
UFCW	3/7/2017	30161MAR4	Barclays	\$114,753	\$114,851	\$98
UFCW	3/21/2017	456837AG8	JP Morgan Chase	\$134,739	\$134,745	\$6
UFCW	3/28/2017	774341AH4	Wells Fargo	\$134,910	\$134,948	\$38
UFCW	5/2/2017	824348AU0	Citigroup	\$119,926	\$120,077	\$151
UFCW	6/27/2017	29250NAQ8	Citigroup	\$104,912	\$105,049	\$137
UFCW	7/27/2017	00206REK4	JP Morgan Chase	\$59,990	\$60,061	\$71
UFCW	9/27/2017	26884LAE9	Citigroup	\$109,712	\$110,164	\$452
UFCW	10/10/2017	666807BQ4	JP Morgan Chase	\$49,993	\$50,018	\$25
UFCW	2/5/2018	55336VAQ3	Barclays	\$59,959	\$59,981	\$23
UFCW	6/10/2019	337738AS7	JP Morgan Chase	\$124,790	\$124,876	\$86
UFCW	8/6/2019	674599CW3	Citigroup	\$69,909	\$70,142	\$233
UFCW	9/19/2019	70450YAC7	JP Morgan Chase	\$54,966	\$55,073	\$107
UFCW	11/5/2019	25272KAG8	JP Morgan Chase	\$43,399	\$43,402	\$4
Total				\$4,257,701	\$4,261,717	\$4,016

Notes & Sources:

FINRA's Enhanced TRACE bond trading data and plaintiff trading data.

The non-competitive markdown is calculated as the difference between the price obtained by Defendants on customer-initiated odd lot sales as compared to average round-lot sales prices for the same bond on the same date.

140. Performing a similar analysis on customer-initiated odd-lot purchases shows a statistically and economically significant markup on Defendant-executed trades. That is, investors pay higher prices for odd-lot purchases as compared to round lot purchases in the same bond executed by Defendant dealers.

141. Applying the non-competitive price markup analysis to Plaintiffs' purchases executed with Defendants (for those Plaintiff trades where a matching average benchmark is available in TRACE) results in total losses of \$10,080 on five Plaintiff buy trades. That is, Plaintiffs actually paid a total of \$460,789 for these five bonds but would have only paid \$450,709 if they would have received round lot prices, for an aggregate loss of \$10,080.

Plaintiff	Trade Date	CUSIP	Defendant Name	Actual Purchase Cost	Round Lot Purchase Cost	Loss to Plaintiff (\$)
Litovich	3/25/2013	413627BM1	Morgan Stanley	\$349,350	\$341,042	\$8,308
Holdcraft	11/17/2015	172967JT9	Wells Fargo	\$51,307	\$50,419	\$888
Holdcraft	3/29/2016	34540TLL4	Wells Fargo	\$15,000	\$14,813	\$188
Holdcraft	5/16/2016	34540TLV2	Wells Fargo	\$25,000	\$24,688	\$313
Holdcraft	5/2/2017	37045XBQ8	Wells Fargo	\$20,132	\$19,749	\$383
Total				\$460,789	\$450,709	\$10,080

Notes & Sources:

FINRA's Enhanced TRACE bond trading data and plaintiff trading data.

The non-competitive markdown is calculated as the difference between the price obtained by Defendants on customer-initiated odd lot sales as compared to average round-lot sales prices for the same bond on the same date.

III. DEFENDANTS ENGAGED IN A PATTERN OF COLLUSIVE CONDUCT TO RESTRICT COMPETITION FROM ELECTRONIC PLATFORMS THAT SOUGHT TO IMPROVE PRICING FOR ODD-LOT BOND INVESTORS

142. Defendants, as the top dealers by market share, admit that they view e-platforms, especially all-to-all trading, as a threat to their business.³⁵ E-platforms can allow Plaintiffs and the

³⁵ Greenwich Associates, *U.S. Corporate Bonds: Investors Need Dealers, Dealers Need Incentives*, at 3 (2015); MSRB, *2016 Fact Book*, at 3.

Class to trade corporate bonds in an all-to-all market, which brings greater pre-trade price transparency and, therefore, significantly narrower spreads (lower transaction costs). Therefore, to maintain wider spreads on odd-lot trades of corporate bonds, Defendants have colluded to prevent the electronic platforms from offering all-to-all trading.

143. As *Bloomberg* recently reported:

Today, about 80 percent of U.S. bond deals are still done by phone or over chat. There aren't any exchanges and everything is negotiated, which gives dealers the upper hand when it comes to where the market is for a given bond. It's a situation that *has enabled the biggest firms, like JPMorgan and Goldman Sachs, to keep a stranglehold on the market.*

And it's not like they have much incentive (or even the legal obligation) to change. *The bond market is littered with startups that have tried – and failed – to loosen Wall Street's grip on bond trading and make it more efficient.* Names like BondBook, BondConnect, BondGlobe, BondHub, BondLink and XBond . . . flopped.³⁶

144. Defendants' collusion included: (1) punishing dealers who engaged in trading activity that had the potential to narrow the spreads; (2) acquiring control of electronic platforms to ensure they did not improve pricing for odd-lots; and (3) engaging in a group boycott of other retail-focused (and therefore, odd-lot focused) electronic trading platforms that sought to improve pricing transparency by denying them liquidity and access to an essential facility, such as Bloomberg's Trade Order Management System ("TOMS").

145. As a result of Defendants' conspiracy, the only electronic platforms that have survived and secured any significant share of corporate bond trading (1) are owned in part by Defendants and (2) provide little, if any, pre-trade price transparency to investors.

³⁶ Nick Baker and Matthew Leising, *Goldman alum wants to revolutionize bond trading*, BLOOMBERG (June 25, 2018), <https://www.theledger.com/news/20180625/goldman-alum-wants-to-revolutionize-bond-trading> (emphasis added).

146. The following chart summarizes some of Defendants' efforts to restrain electronic trading that would have provided pre-trade price transparency to investors in odd lots of corporate bonds.

Electronic Trading Platforms	Time Period	Defendants' Concerted Efforts
InterVest Trading System	mid-1990s - February 1998	Bloomberg terminated the service due to pressure from Defendants.
TradeWeb	1996-now	Defendants took control of TradeWeb to maintain TradeWeb as a dealer-to-dealer market structure rather than all-to-all trading. Defendants also used TradeWeb to acquire BondDesk and permanently foreclose BondDesk as a retail-focused platform.
ABS/NYSE	1976-now	Defendants engaged in a group boycott to not provide or severely limit order flow to ABS/NYSE Bonds. Defendants also engaged in collusive efforts to deny and/or delay ABS/NYSE Bonds from gaining access to Bloomberg's Trade Order Management System ("TOMS"), an essential facility necessary for any new entrant providing electronic trading of corporate bonds.
Bonds.com	2005-2014	Defendants refused to participate with Bonds.com as part of a group boycott.
BondDesk	1999-now	Defendants abused their board positions on BondDesk to remove leadership that had pursued offering retail-sized odd-lot investors more transparency and better pricing.
Trading Edge	1999-2001	Trading Edge was acquired by MarketAxess, an electronic trading platform open only to institutional investors and founded by, among others, JPMorgan. MarketAxess shuttered Trading Edge's anonymous trading platform.

A. Defendants' Pattern of Punishing Dealers Who Might Engage in Competitive Trading Activity

147. From the 1980s through the present, Defendants have engaged in a pattern of parallel conduct to monitor and enforce their agreement by threatening or inflicting penalties on any market participant that might have engaged in competitive trading activity with the potential to narrow the bid ask spreads in odd-lots.

148. In particular, Defendants refused to transact business with any market participant that threatened the operation of their conspiracy. They did so by placing them in a “penalty box” – a form of discipline that could range from several weeks to several months. During time in the penalty box, no employees of the Defendant firm administering the discipline would transact with the penalized market participant. For example, when odd-lot traders employed by InterVest engaged in trading that Salomon Smith Barney (later acquired by Citigroup) deemed to be “disruptive” of the market, Salomon refused to do business with those traders. None of the other Defendants stepped in to do business with the traders instead, as one would expect in a competitive market.

149. Defendants' efforts to discipline and punish those who threaten to narrow odd-lot spreads continue to this day. During the period from 2015-2019, due to the growth of its ETF bond fund business, Blackrock needed to rebalance its ETF bond portfolios as well as respond to redemption requests in such bond fund portfolios requiring it to trade odd-lot bonds. Because of the increasing volume of such odd-lot bond trades, Blackrock was motivated to execute such odd-lot trades at narrower spreads than offered by the Defendant. Because Defendants could force even Blackrock to pay supracompetitive spreads, Blackrock began to use competitive regional banks and brokers such as First Tennessee, Piper Jaffrey, and McDonald & Co. for its odd-lots trading needs because of the narrower spreads they provided. When defendant Morgan Stanley

learned that Blackrock was providing First Tennessee with axe sheets and allowing it to take volume away because of the narrower spreads that it was providing, Morgan Stanley threatened to limit any business that it transacted with First Tennessee and blackball them. Defendant Morgan Stanley monitored and enforced the agreement by punishing First Tennessee for offering narrower spreads for such transactions.

150. As more and more bond traders moved to electronic trading platforms, Blackrock also began to use MarketAxess as a venue for executing the odd-lot bond trades that were necessary to rebalance its ETF bond funds and to process redemptions. During the period from 2016 through 2018, Blackrock used electronic RFQs available on MarketAxess to execute directly with regional banks such as First Tennessee, Piper Jaffrey, and McDonald & Co. in order to benefit from the narrower spread that such dealers provided. Eventually, defendants Morgan Stanley and Citibank learned of these transactions and once again threatened to punish First Tennessee for offering narrower spreads for such transactions.

151. When individual employees of disciplining Defendant dealers tried to help the traders that were being penalized (by, for example, transacting business with them), they did so at risk of losing their jobs with the Defendant dealer. The substantial risks faced by employees ensured that the penalty box – the disciplining action – worked.

B. Dealers Shut Down the InterVest Trading System

152. In the mid-1990s, InterVest Financials Services was set to debut a new electronic trading system for corporate bonds. The system promised anonymous, push-button trading (transparent and firm prices), which promised to cut commissions by over 75%. InterVest struck a deal with Bloomberg to provide its system on Bloomberg terminals, which are ubiquitous in the financial industry. The relationship quickly soured.

153. Following the announcement of InterVest on Bloomberg, bond dealers began to complain to Bloomberg that InterVest offered a service that competed with them. When Bloomberg tried to put a moratorium on InterVest going live, InterVest threatened legal action. InterVest's time on Bloomberg, however, was short-lived. Barely a year after launching in December 1996, Bloomberg terminated the service by February 1998 due to pressure from Defendants.

C. Defendants' Joint Ownership of TradeWeb Allowed Them to Stifle Competition from Electronic Platforms that Threatened to Improve Odd-Lot Pricing

154. TradeWeb was founded in 1996 (with its first electronic marketplace going live in 1998) by Jim Toffey, a former Credit Suisse employee. Initial funding came from Credit Suisse, Lehman Brothers (later acquired by Barclays), Salomon Smith Barney (later acquired by Citigroup), and Goldman Sachs. By 2004, TradeWeb had added Citigroup, Merrill Lynch, Morgan Stanley, JPMorgan, and Deutsche Bank to its consortium of owners.

155. While TradeWeb initially focused on Treasury bonds, its electronic trading platform was well-suited for trading corporate bonds. News reports from this period, however, suggested that Defendants invested in TradeWeb out of fear that emerging electronic platforms would decrease their market power in corporate bonds. In 2001, *Forbes* explained that "TradeWeb came to life as much out of fear as out of efficiency. For brokers, electronic ordering systems threatened to squeeze already thin margins even further. But unlike new digital startups that sought to eliminate established intermediaries, TradeWeb was created with the aim of maintaining the status quo. TradeWeb helps existing bond brokers and dealers do their jobs faster."³⁷

³⁷ Neil Weinberg, *B2B Grows Up*, FORBES (Sept. 10, 2001), <https://www.forbes.com/best/2001/0910/018.html>.

156. A 2000 *Euromoney* article laid the situation out in even starker terms, describing TradeWeb as “the textbook case on the politics of multi-bank consortia.”³⁸ The *Euromoney* article cited an example where TradeWeb’s bank owners founded rival platforms to TradeWeb to weaken TradeWeb itself. According to the *Euromoney* article, TradeWeb shareholders Goldman Sachs, Merrill Lynch, and Morgan Stanley founded BondBook as an attempt to preempt TradeWeb’s entry into the non-treasuries bond market. Summing up the situation, the *Euromoney* article explained that “ultimately ***TradeWeb is only as independent as the seven banks [that own it] want it to be.*** And all of them are invested in other models: five are in BondBook (Deutsche, Goldman, Merrill [now owned by Bank of America], Morgan Stanley, Salomon [now owned by Citigroup]) and the other two, CSFB [Credit Suisse] and Lehman [now owned by Barclays], are in MarketAxess.”

157. The same *Euromoney* article quoted one unnamed “head of investment banking e-commerce at a US investment bank” as saying, “[h]aving a stake in BondBook or MarketAxess is a way of replacing money which we made on market-making but which will be lost once it goes electronic[. . .] That’s why we run them as for-profit businesses [rather than utilities]. ***But if an anonymous platform such as BondBook [or TradeWeb or MarketAxess] succeeds, it will kill market-making profits for everyone.*** So, if you’re not an equity holder, you lose revenues and you get no compensation for it.”³⁹ Defendants’ purchase of anonymous platforms that would otherwise introduce innovation and efficiencies to odd-lot trading and threaten cartel profits is a game of “catch and kill” that enables the Defendants to maintain their ability to extract monopoly rents from Plaintiffs and the Class.

³⁸ Antony Currie, *Could TradeWeb unravel from inside?*, EUROMONEY (Dec. 1, 2000), <https://www.euromoney.com/article/b1320hxsf8zy1x/could-tradeweb-unravel-from-inside>.

³⁹ *Id.* (emphasis added).

158. In 2004, Thomson Reuters purchased TradeWeb from its dealer bank owners. At least one source has attributed this sale to “regulatory concerns over potential conflicts of interest and competition issues in dealer-owned networks.”⁴⁰ Indeed, in 2000, the Department of Justice had issued antitrust civil investigative demands to similar electronic bond trading platforms BondBook, BondDesk, and MarketAxess, and contacted Merrill Lynch, Salomon Smith Barney/Citigroup, Morgan Stanley, and Deutsche Bank as part of a probe the DOJ described as an effort to look into “the competitive effects of certain joint ventures in the online bond trading industry.”⁴¹

159. As part of the sale of TradeWeb to Thomson Reuters, however, the Defendants agreed to a four-year contract whereby “the founding investment banks . . . would steer liquidity to TradeWeb.”⁴² Without this liquidity from the major dealers, TradeWeb would cease to be an effective trading platform.

160. With that deal scheduled to end in 2008, Thomson Reuters “realized the banks would take their liquidity and shop it around, which would threaten the value of TradeWeb.”⁴³ To prevent that from happening, Thomson Reuters proposed “Project Fusion,” a joint ownership structure that went into effect in January 2008 that gave minority ownership stakes in TradeWeb to Credit Suisse, Goldman Sachs, Lehman Brothers (later acquired by Barclays), Merrill Lynch

⁴⁰ *Wall Street firms pay \$180 million to buy back into TradeWeb*, FINEXTRA (Oct. 11, 2007), <https://www.finextra.com/newsarticle/17582/wall-street-firms-pay-180-million-to-buy-back-into-tradeweb>.

⁴¹ John Parry, *Online Bond Trading Tie-Ups Highlight an Antitrust Issue*, WSJ (May 10, 2001), <https://www.wsj.com/articles/SB989513870694056329>.

⁴² Ivy Schmerkin, *BREAKING NEWS: Thomson Plans to Spin Off TradeWeb*, WALL STREET & TECHNOLOGY (Oct. 10, 2007), <https://web.archive.org/web/20170109021802/http://www.wallstreetandtech.com/trading-technology/breaking-news-thomson-plans-to-spin-off-tradeweb/d/d-id/1258992>.

⁴³ *Id.*

(later acquired by Bank of America), Morgan Stanley, JPMorgan, Deutsche Bank, and RBS.⁴⁴ In April 2008, Citigroup acquired an equity stake in TradeWeb as well.⁴⁵

161. Defendants assured their control of TradeWeb by denuding its independence and placing loyal senior executives on TradeWeb's the Board of Directors. In 2010 Defendants and other primary dealers collectively held 16 of the 26 seats on TradeWeb Board of Director and governance committees. For example, Defendants installed Vic Simone, a Managing Director at Goldman Sachs and then-Global Head of its Principal Strategic Investments Group ("PSI Group"), as Chairman of the Board of Directors of TradeWeb.⁴⁶ In 2011, Brad Levy replaced Vic Simone as the Head of Goldman Sachs' PSI Group. At the same time, Levy also took over as the Chairman of the Board of Directors of TradeWeb.⁴⁷ Defendants also appointed Lee Olesky, the former Chief Operating Officer for Fixed Income at Credit Suisse, to serve as CEO of TradeWeb.

162. Defendants' executives on the TradeWeb board also included:

- Colin Corgan (a partner of Goldman Sachs' Rates Desk);
- Simon Maissey (JP Morgan, later joined TradeWeb as a Managing Director in 2014);
- Kemal Askar (JP Morgan's Head of Rates Trading in the United States);
- Shea Wallon (a managing director of Bank of America's Global Strategic Capital Investments group);

⁴⁴ *Id.*

⁴⁵ Thomson Corp., *Citi Takes Equity Stake in TradeWeb*, MARKETSCREENER (April 8, 2008), <https://www.marketscreener.com/THOMSON-CORP-14638/news/Thomson-Corp-Citi-Takes-Equity-Stake-in-Tradeweb-491596/>.

⁴⁶ *See* TRADEWEB, *Tradeweb Appoints New CEO* (Sept. 9, 2008), <http://www.tradeweb.com/News/News-Releases/Tradeweb-Appoints-New-CEO/>.

⁴⁷ *Id.*

- Dexter Senft (Barclays and later Head of Morgan Stanley’s Fixed Income E-Commerce division);
- Andrew Challis (Head of eFICC Distribution and Market Strategic Investments for Barclays);
- Sandeep Arora (the Chief Operating Officer of Citi);
- Nicholas Brophy (the Head of Rates Trading in the Americas of Citi);
- Sean Flynn (the Global Head of Investment Banking Strategy of Credit Suisse);
- Timothy Blake (the U.S. Head of Interest Rates Trading of Credit Suisse);
- Michele Faissola (the Head of Global Rates of Deutsche Bank);
- Stephen Wolff (the Head of Strategic Investments and Head of Fixed Income E-Commerce of Deutsche Bank);
- Dexter Senft (the Global Head of Fixed Income E-Commerce of Morgan Stanley); and
- Richard Volpe (the Global Head of Dollar Interest Rates of RBS/NatWest).

163. Defendants’ ownership and control of TradeWeb (as well as other platforms, such as MarketAxess) gave them both the ability to shut out odd-lot investors from using these platforms, and the ability to use TradeWeb as a “stalking horse” to catch and kill would-be electronic platforms that threatened to offer better pricing transparency to odd-lot investors (as discussed further below). To this day, Defendants continue to stifle efforts to bring the benefits of all-to-all trading of odd-lots to TradeWeb and in turn limit TradeWeb’s ability to grow volume. By limiting TradeWeb’s ability to offer pre-trade price transparency inherent in all-to-all trading,

Defendants perpetuate their ability to widen spreads (and thus accrue supracompetitive profits) for odd-lot transactions.

D. Defendants’ Group Boycott and Collusive Effort to Deny and/or Delay ABS/NYSE Bonds from Gaining Access to Bloomberg’s Trade Order Management System

164. As discussed above, until 1946, corporate bonds traded on the NYSE in the United States. In 1976, the NYSE attempted to revitalize bond exchange trading by introducing the Automated Bond System (“ABS”), an electronic bond order book with time and price priority. The ABS originally allowed trading in 1,000 debt security issues, including corporate bonds.

165. However, despite backing by the NYSE and the historical success of exchange-based trading for corporate bonds, ABS failed. By 2002, only 5% of all corporate bonds were listed on ABS for trading. By 2006, only 333 U.S. corporate bond issues (around 1% of the total number of unique TRACE-eligible corporate bond issues traded that year) traded on ABS.

166. In 2007, ABS was replaced by NYSE Bonds, which stated that its goal was to allow trading in 6,000 debt security issues, mostly corporate bonds.⁴⁸ NYSE Bonds offered pre-trade pricing transparency for investors with executable as opposed to indicative prices, and had a pro-investor impact on bond pricing: a 2014 study found that corporate bonds listed on NYSE Bonds between 2008-2011 had bid-offer spreads – even when traded OTC – that were 10 basis points lower than comparable bond issues not listed on NYSE Bonds and only traded OTC.⁴⁹ The positive effect on prices found for investors applied to all sizes of trades, but was greatest for so-called retail-sized trades of less than \$100,000.

⁴⁸ Liz Moyer, *NYSE Plunges Into Bonds*, FORBES (March 23, 2007), https://www.forbes.com/2007/03/23/nyse-bonds-trading-biz-cx_lm_0323nyse.html#e370b23d7d3e.

⁴⁹ Fan Chen and Zhuo Zhong, *Pre-Trade Transparency in Over-the-Counter Markets* (July 2014).

167. Despite its success at improving transaction costs for bond investors (in particular retail bond investors trading exclusively in odd-lots), NYSE Bonds failed to gain traction in trading among dealers. As of November 2017, only 25 bond dealers continued to participate in NYSE Bonds. Even this number might overstate participation in trading corporate bonds on NYSE Bonds – NYSE Bonds does not identify what dealer participants trade in or at what volumes they trade, so participants may be trading only limited numbers of corporate bonds, or even none at all, since NYSE Bonds also provides municipal bond trading, and U.S. and foreign government bond trading.

168. ABS and NYSE Bonds failed to achieve larger-scale success among investors because of (a) a concerted boycott of the platforms by Defendants, and (b) collusive efforts by Defendants to deny or delay NYSE Bonds access to the Bloomberg TOMS facility, an essential venue necessary for any newcomer seeking to participate in and compete within the corporate bond market. By impeding the growth and success of ABS and NYSE Bonds, Defendants hindered increased pre-trade price transparency in the odd-lot bond market, thereby preventing increased price competition within that market.

169. Defendants engaged in a group boycott to not provide or allow order flow to ABS/NYSE Bonds, or to severely limit such order flow to a small number of corporate bond issues.

170. All entities trading securities electronically use trade order management systems for execution, administration, accounting, compliance, and other related trading needs. Generally speaking, a given type of security will only have one dominant trade order management system, as it is time- and cost-prohibitive for all parties to support multiple systems.

171. A new entrant in the electronic trading market for a given security must offer connectivity to the pre-existing dominant trade order management system in place for that security.

These trade management systems are necessary portals to the market for electronic trading in that type of security, and, as such, are essential facilities for interconnected access for any new electronic trading platform.

172. With respect to the electronic trading of corporate bonds, the sole trade order management system in place in the market during the Class Period is Bloomberg's TOMS. Bloomberg advertises TOMS as "deliver[ing] global, multi-asset solutions for front-end inventory, trading and middle- and back-office operations" that allow users to "optimize your voice and electronic trade workflow, increase global distribution to markets, manage risk and compliance and improve operational efficiency." Everyone trading corporate bonds electronically, including Defendants, must use Bloomberg TOMS. Thus, access to Bloomberg TOMS is essential for participating and competing in this market.

173. Obtaining access to Bloomberg TOMS should have taken a short period of time for NYSE Bonds, particularly given the significance and power of the New York Stock Exchange – at most, five months. Instead, NYSE Bonds was not given a connection to Bloomberg TOMS for 18-19 months – a delay that crippled NYSE Bonds' ability to gain traction in the electronic bond trading market.

174. Defendants – which are large financial institutions with significant accounts with Bloomberg's separate and profitable Bloomberg Terminal business – used their market power and value to Bloomberg as Bloomberg Terminal customers to force Bloomberg to materially delay NYSE Bonds' connection to the essential facility of Bloomberg TOMS. Defendants forced Bloomberg to delay NYSE Bonds' connectivity through Bloomberg TOMS by threatening to terminate or reduce their Bloomberg Terminal leases if Bloomberg failed to do so. Defendants concerted efforts to thwart NYSE's efforts to operate efficient all-to-all trading for corporate bonds

sent a message to others in marketplace thinking about threatening Defendants' dominance in corporate bond trading. If Defendants could use Bloomberg to hinder the NYSE, they could stop any potential market entrant that threatened their inflated spreads.

E. Defendants' Refusal to Participate with Bonds.com

175. Another example of Defendants' collusive conduct designed to prevent competition from electronic platforms is their refusal to deal with Bonds.com.

176. Bonds.com was founded in 2005 by John J. Barry IV, a former bond underwriter and trader at ABN-AMRO Bank. According to Barry, Bonds.com had "a single goal in mind: Empower the self-directed individual and institutional investors with a no cost trading platform, enabling execution, aggressive pricing and education in the fragmented fixed income market place."⁵⁰ Bonds.com sought to do this with electronic, all-to-all, anonymous exchange-like trading focused on retail and institutional investors transacting in odd-lots of corporate bonds.

177. Bonds.com's initial bond trading platform, BondStation, launched in January 2008, and was open to both retail and institutional investors. BondStation's marketing materials boasted that it was "The End of the Middle Man" and cast itself as the solution to "Price gauging [sic] by dealers" that could result in markups of "3% or more along the way," with "100% price and product visibility," "fee-less transactions," and "no liquidity provider fees."

178. After just three months, however, Bonds.com jettisoned BondStation's retail odd-lot focus amidst pressure from dealers such as Defendants. In April 2008, the company "[r]efocused from the retail segment to the institutional segment due to market conditions and other economic factors." One of those "market conditions" was a group boycott of the retail

⁵⁰ *Bonds.com CEO John J. Barry IV Provides Comprehensive Company Update in Open Letter to Investors*, BONDS.COM, http://files.shareholder.com/downloads/BONDS/0x0x239374/45717632-ec8f-4b11-80b1-97b56386fa33/BDCG_News_2008_10_7_General_Releases.pdf.

focused BondStation by dealers. The majority of trades executed on BondStation remained retail up through May 2008; after that point, institutional trades predominated.

179. In 2010, the company discontinued its use of BondStation and its service for “institutional and self-directed individual fixed income investors,” and shifted to a platform called BondsPro, which “offers professional traders and large institutional investors an alternative trading system to trade odd-lot fixed income securities.” This shift to a focus on institutional odd-lot investors rather than retail investors allowed Bonds.com to secure two rounds of funding to continue operations. BondsPro, however, continued to allow all-to-all, anonymous, exchange-style trading – trading that would eliminate Defendants as middlemen, or force them through anonymous pricing competition to lower odd-lot bid-offer spreads.

180. Between 2012 and 2013, Bonds.com sought liquidity on its BondsPro platform from major corporate bond dealers like Defendants, including Bank of America, JPMorgan, and Morgan Stanley, among others. None of the dealers would participate with Bonds.com and the Defendants monitored and enforced their conspiracy to make sure there would be no defectors. Bank of America indicated that it had interest in participating on BondsPro, but that it could not do so due to the blowback it would suffer from other Defendants. Of course, threatening to punish cartel defectors is further evidence of the existence of the conspiracy. Bank of America stated that it would only be willing to participate on Bonds.com if at least one or two of the larger dealers (such as Morgan Stanley or JPMorgan) also participated and could provide it cover from retribution.

181. As a result of this group boycott by Defendants of Bonds.com’s all-to-all, anonymous odd-lot trading platform, Bonds.com ran out of money by late 2013 and was sold in 2014 to MTS, a subsidiary of the London Stock Exchange Group.

F. Defendants Abused Their Board Positions on BondDesk to Remove Leadership that Had Pursued Offering Odd-Lot Investors Better Pricing Transparency

182. BondDesk was founded in 1999 as a bond platform designed to “effectively distribute dealer inventory to regional broker-dealers, smaller shops and investment advisors.”⁵¹ From its inception, BondDesk focused on retail-sized trades and catered to investment advisors representing retail investors.

183. By 2004, BondDesk had grown to a 100-employee company. Much like TradeWeb and MarketAxess, however, it had sold ownership stakes to 14 major banks, including Defendants such as Goldman Sachs, Bank of America, JPMorgan, and Wells Fargo.

184. In exchange for their investments in BondDesk, Goldman Sachs, Bank of America, JPMorgan, and Wells Fargo (themselves or via predecessors they later acquired) eventually secured six of the 11 seats on the Board of Directors of BondDesk in 2004 for individuals affiliated with Defendants: Brad Levy (Goldman Sachs), Richard Kolman (Goldman Sachs), Matthew Frymier (Bank of America), Charles Forrest (A.G. Edwards, later acquired by Wells Fargo), Ronald Hersch (Bear Stearns & Co., later acquired by JPMorgan), and Thomas Hoops (First Union Investors, Inc., later acquired by Wells Fargo).

185. Despite investing in BondDesk, Defendants saw the innovations that BondDesk and its management had introduced to the bond market (including in regard to improving transparency and price competition for odd-lots) as a threat to the supracompetitive profitability they enjoyed from wider bid-offer spreads on odd-lots of corporate bonds.

⁵¹ See REUTERS: *Alternative trading system BondDesk up for sale* (Aug. 31, 2013), <https://www.reuters.com/article/idUS6254185320130901>.

186. In response to this threat, Defendants conspired to use their control of the BondDesk board to remove the existing management of BondDesk from their day-to-day leadership positions at the company in 2004. Brad Levy of Goldman Sachs and Matthew Frymier of Bank of America, in particular, led this effort.

187. Defendants pressured the leadership of BondDesk to leave by raising false concerns with the rest of BondDesk's board about the accounting BondDesk used for stock options. At the time, BondDesk used Grant Thornton as its outside accounting firm.

188. Levy and Frymier began by reaching out to Grant Thornton's partner in charge of the BondDesk account and encouraged him to raise a red flag regarding the existing accounting treatment for stock options and the need to restate BondDesk's accounting statements. Levy and Frymier realized that if there were any improprieties in the stock option accounting treatment, management would be held responsible.

189. In exchange for raising the red flag, Levy and Frymier offered to refer additional accounting clients to Grant Thornton.

190. Grant Thornton agreed to raise the red flag requested by Levy and Frymier, and the board (again controlled by a majority of directors affiliated with Defendants) used this stock options accounting issue as a ruse for a vote to remove BondDesk management, who was not supportive of the Defendants' interest in maintaining a corporate bond market in which odd-lot investors had little transparency and where Defendants could realize supracompetitive profits from wider bid-offer spreads resulting from them not having to compete.

191. After odd-lot supportive management was forced out of, or sidelined from, BondDesk management, the Grant Thornton review of the stock options accounting issue was resolved without any changes being made to the existing accounting procedure.

G. Defendants Use TradeWeb (Which They Owned) to Acquire BondDesk and Permanently Foreclose BondDesk as a Retail-Focused Platform

192. Later, in 2006, Advent International Corporation, a private equity firm, bought a majority stake in BondDesk Group from its bank owners, thereby freeing BondDesk to pursue business from (and improve prices for) retail-focused odd-lot traders. As a first step in this process, BondDesk announced in 2007 that it was extending its “online odd-lot fixed-income marketplace to institutional traders and portfolio managers,” but not retail investors directly. It did so via its BondDesk Institutional platform, which “connect[ed] broker-dealers through a centralized marketplace by offering a diverse pool of liquidity.”⁵²

193. By 2011, BondDesk was facilitating roughly a third of all retail-sized trades and was the primary bond trading platform for odd-lot-sized trades by several major retail and institutional investment advisors. BondDesk’s success was due, in part, to undercutting Defendants’ pricing. As one industry participant stated, BondDesk was “help[ing] the consumer to not absolutely get killed. Consumers can buy 10 bonds for not so much higher a spread than what institutions pay for 10,000 bonds.”⁵³

194. In August 2011, BondDesk hired Kim Bang from Bloomberg to be its CEO. Mr. Bang announced that his plan was to roll out a technology system at BondDesk for direct retail trading without the involvement of portfolio managers – directly threatening Defendants’ role as intermediaries in the OTC market and the supracompetitive bid-offer spreads they charged retail odd-lot investors. To this end, Mr. Bang implemented BondWorks, which created workstations

⁵² See *BondDesk Extends Largest Online Odd-Lot Fixed Income Marketplace*, BUSINESSWIRE (May 29, 2007), <https://www.businesswire.com/news/home/20070529005238/en/BondDesk-Extends-Largest-Online-Odd-Lot-Fixed-Income-Marketplace>.

⁵³ See Brooke Southall, *Executive leaves Bloomberg with ambitious plan to unify the retail bond market*, RIABIZ (Aug. 18, 2011), <https://www.riabiz.com/a/2011/8/19/executive-leaves-bloomberg-with-ambitious-plan-to-unify-the-retail-bond-market>.

for advisors and brokers to have direct access to BondDesk’s fixed income wealth management platform. Nineteen out of the top 20 bond brokers, including E*Trade, were expected to use BondWorks, which would eventually enable retail investors to access BondDesk for trading directly.

195. By November 2011, BondDesk had also announced a partnership with Trade West Systems, a division of MarketAxess, to enable “BondDesk clients to seamlessly source liquidity from third party platforms . . . in effect creating a retail supermarket for bonds.”⁵⁴ This service was immediately made available to BondDesk’s dealer clients, but not investors.

196. In July 2013, BondDesk announced “Recognizing the need for improved price transparency in the odd-lot fixed income markets, BondDesk Group LLC and S&P Capital IQ today announced a new pricing service for U.S. corporate and municipal bonds, Odd-Lot Valuations.”⁵⁵ At the time of the announcement, “BondDesk was the largest odd-lot fixed income trading venue in the United States.” Howard Edelstein, CEO and Chairman of BondDesk Group LLC stated, “There are often differences between the round-lot evaluated prices that investors see before making a trade and the prices at which their odd-lot trades get executed. What the industry needs is a pricing service that reduces this discrepancy and provides an independent benchmark to help assess price quality. Our service will provide these benefits.” BondDesk sought to bring “quality prices” and “higher levels of certainty and efficiency to the odd-lot market.” A managing director at BondDesk further stated, “Approximately 90% of corporate and

⁵⁴ See *BondDesk Announces Partnership with Trade West Systems to Include Aggregation to Extend to Rival Platforms*, BUSINESSWIRE (Nov. 21, 2011), <https://www.businesswire.com/news/home/20111121005163/en/BondDesk-Announces-Partnership-Trade-West-Systems-Extend>.

⁵⁵ See *BondDesk and S&P launch Odd-Lot Pricing Service*, BondDesk (July 25, 2013), <https://www.finextra.com/pressarticle/50901/bonddesk-and-sp-launch-odd-lot-pricing-service>.

municipal bond trades are less than \$1 million in size. It's crucial for participants in this marketplace – investors, traders, financial advisors, compliance officers and portfolio managers – to have a relevant benchmark for trade execution and portfolio pricing. Now they will.” BondDesk announced this service would launch in the fourth quarter of 2013.

197. In August 2013, BondDesk reaffirmed its commitment to making “fixed income markets more transparent and accessible to retail investors” by making its Factsheet bond pricing service free of charge to any investor (up until then, the service had only been available to financial advisors using BondWorks).⁵⁶

198. Threatened by these moves that would provide greater price transparency to odd-lots investors and allow investors the opportunity to trade outside of the Defendant-controlled OTC market, Defendants took action. Specifically, TradeWeb – an electronic platform open only to institutional investors and owned in part by Bank of America Merrill Lynch, Barclays, Citigroup, Goldman Sachs, JPMorgan, and Morgan Stanley – acquired BondDesk on November 1, 2013.

199. Initial reports suggested that BondDesk's purchase by TradeWeb would present an opportunity for TradeWeb to expand into odd-lot bond trading and to break the boundaries between retail and institutional liquidity. Reuters noted that BondDesk's sale was an opportunity to “improve how bonds are presented to retail customers” and to “make pre-trade pricing and benchmarks more accessible. . . . [the] BondDesk platform is the perfect place for this information to be available. Its new owner could take the lead in the odd-lot market.”⁵⁷

⁵⁶ See *BondDesk's Bond Factsheet Service Now Free for a Limited Time to All Investors*, BUSINESSWIRE (Aug. 14, 2013), <https://www.businesswire.com/news/home/20130814005758/en/BondDesk%E2%80%99s-Bond-Factsheet-Service-Free-Limited-Time>.

⁵⁷ See Reuters, *supra* note 51.

200. BondDesk’s promise to improve trading, transparency, and ultimately prices for retail investors never materialized after Defendants used TradeWeb to acquire it. Instead, BondDesk was folded into TradeWeb Direct – a platform that provided only RFQ and click-to-trade trading in odd-lots without pre-trade pricing transparency.⁵⁸

201. Today, TradeWeb Direct (formerly BondDesk) facilitates one in seven corporate bond trades reported to TRACE. TradeWeb Direct is “on the desktop of every financial adviser at UBS, JPMorgan, Stifel Nicholas, RBS, Raymond James, BBNT, RW Baird. . . . [and in] pre-rollout/pilot stage at Morgan Stanley, Wells Fargo, Ameriprise Financial, Vanguard, and Fidelity.”⁵⁹ Because Defendants have prevented investors in odd-lots from using BondDesk as an actual all-to-all direct-trading platform, BondDesk does nothing to reduce the bid-offer spreads of odd-lot transactions relative to round lot transactions of the same bond issues, thereby perpetuating Defendants’ ability to accrue supracompetitive profits from odd-lot investors.

H. Other Retail Focused Electronic Platforms for Trading Bonds Failed Due to Defendants’ Resistance

202. Defendants’ agreement to prevent competition from electronic platforms focused on odd-lots trading spanned nearly 20 years and continues to this day.

203. In the late 1990s, with the advent of the internet, there was an explosion of bond e-trading startup companies. According to a 2001 report by the Tuck School of Business at Dartmouth, 89 fixed-income trading platforms existed in the first quarter of that year.⁶⁰ Almost

⁵⁸ A FAQ on TradeWeb’s website notes that “you must be an institutional investor to trade on TradeWeb” and that you are required to be “set up with dealers to trade on TradeWeb.”

⁵⁹ See <https://events.wealthmanagement.com/tradeweb-direct> (last visited Oct. 28, 2020).

⁶⁰ Examples of such platforms included BondConnect, BondGlobe, BondHub, BondLink, InterVest, Visible Markets, XBond, Limit Trader, and Trading Edge. See Jake Thomases, *Corporate Bonds: The Lost Generation of Corporate Bond Platforms*, WATERSTECHNOLOGY (May 31, 2013).

all of these late 1990s-early 2000s electronic trading platforms for corporate bonds failed within a few years. While some lacked sufficient capitalization, others had sub-standard technology, and still others had flawed business models, the largest impediment to the success of these platforms was (and remains) the resistance of Defendants. As one journalist noted:

Sell-side resistance to the wave of new [electronic] platforms was motivated by profit-and-loss (P&L). Dealers controlled the corporate bond trade. Something like an order book or matching system, where the buy side can trade directly with each other, would have pushed them farther toward the sidelines. It is believed that they helped eliminate those platforms which might otherwise have gained traction and cut them out. . . .

[A 2013] Tabb [Group] poll . . . showed 75 percent of [dealer] respondents calling “vested interests” the biggest reason why central limit order books [a.k.a. exchange-based electronic platforms] have had trouble finding a foothold in fixed income.⁶¹

204. Even when such electronic platforms had success, they were quickly acquired and shuttered by Defendant-backed platforms, as occurred with BondDesk. For instance, Trading Edge had some success in 1999-2000 with an exchange-like electronic trading platform that allowed anonymous matching on bond trades designed to increase available liquidity to investors and thereby decrease bid-offer spreads.

205. However, in March 2001, Trading Edge was acquired by MarketAxess, an electronic trading platform founded in 2000 by, among others, JPMorgan. As late as 2011, JPMorgan Asset Management Holdings Inc. still held a 17.5% stake in MarketAxess. Richard McVey, CEO of MarketAxess, said that the company “believe[s] investor response to having both multi-dealer and anonymous trading models on one platform will be overwhelmingly positive,” and MarketAxess stated that it would integrate Trading Edge’s anonymous trading capability to

⁶¹ *Id.*

its current platform, offering investors the option of immediate liquidity through disclosed counter party or anonymous trading.

206. However, within seven months of the acquisition, MarketAxess shuttered Trading Edge’s anonymous trading platform, stating that it had “decided to terminate [Trading Edge’s] anonymous convertible and municipal bond trading platforms and currently offer U.S. corporate bond and emerging bond trading on a fully disclosed [*i.e.*, non-anonymous] basis only.” As one analyst later noted, Trading Edge was “an anonymous model that could have threatened MarketAxess’s business model” – and also therefore threatened the centrality and control over bid-offer spreads that MarketAxess’s bond dealer backers (including Defendants) enjoyed.

IV. PLUS FACTORS DEMONSTRATE DEFENDANTS’ CONDUCT CANNOT BE EXPLAINED AWAY AS MERE PARALLEL CONDUCT

207. Defendants’ conduct – consistently charging unjustified higher transaction costs for odd-lot bonds versus round lot bonds – is not mere parallel conduct. Numerous plus factors, recognized by the antitrust enforcement agencies and the courts as indicia suggesting collusive conduct, exist to demonstrate the plausibility of Plaintiffs’ alleged conspiracy.⁶²

⁶² See, e.g., ABA Section of Antitrust Law (2018), *Proof of Conspiracy Under Federal Antitrust Laws*, Section III.E.3, quoting from *Merck-Medco Managed Care v. Rite Aid Corp.*, 201 F.3d 436, at *10 (4th Cir. 1999). (“Courts discuss conduct against self-interest as a plus factor and the fundamental principle underlying many other kinds of conduct to which the plus factor label is attributed. The basic concept behind this factor is that if the defendants have engaged in conduct that would further the interests of a conspiracy but would be against each defendant’s interest if it were acting separately, the actions taken by the defendants are circumstantial proof of conspiracy. Such evidence has been described as ‘perhaps the strongest plus factor indicative of a conspiracy.’”) *Id.*

A. Defendants' Action Are Against Their Unilateral Self-Interest in the Absence of an Agreement

1. Peer-Reviewed Research Demonstrates Actions Against Unilateral Self-Interest in the Absence of an Agreement

208. As discussed in §II.A, peer-reviewed research on odd-lot versus round lot trading in the corporate bond market demonstrates that dealers charge odd-lot investors higher selling prices and pay them lower purchase prices than round lot investors for the same bond issue. This “adverse pricing” results in wider spreads, and therefore higher costs, for odd-lot investors than round lot investors, at a statistically significant magnitude.

209. Antitrust scholars have concluded that such statistically significant differences between actual and competitive prices constitute a plus factor consisting of “actions or conduct that could occur in the presence of a collusive agreement but that are highly unlikely to occur in its absence.”⁶³ In the present case, 11 different peer-reviewed studies have found “adverse pricing,” thus providing ample empirical evidence in support of this plus factor.

2. Analysis of Riskless Principal Trades Demonstrates Actions Against Unilateral Self-Interest in the Absence of an Agreement

210. As discussed in §II.B, economic analysis demonstrates that RPT spreads on transactions implemented by Defendants show economically and statistically significant differences in transaction costs for round lot and odd-lot trades.

211. As noted above, antitrust scholars have concluded that such statistically significant differences between actual and competitive prices constitute a plus factor consisting of “actions or conduct that could occur in the presence of a collusive agreement but that are highly unlikely to

⁶³ W. Kovacic, R. Marshall, L. Marx, and H. White, “*Plus Factors and Agreement in Antitrust Law*,” MICHIGAN LAW REVIEW, vol. 110, pp. 393-436, at 428 (2011). *See also* E. Marshall, and L. Marx, *The Economics of Collusion*, MIT PRESS, Ch. 4 (2012).

occur in its absence.”⁶⁴ In the present case, the fact that RPT spreads on transactions implemented by Defendants show economically and statistically significant differences in transaction costs for round lot and odd-lot trades demonstrates the existence of this plus factor.

3. Defendants’ Adverse Pricing for Odd-Lots Demonstrates Actions Against Unilateral Self-Interest in the Absence of an Agreement

212. The costs to Defendants for actual transmission and trading execution is, on information and belief, the same whether the Defendants are dealing in odd-lots or round lots of corporate bonds. The round lot spread differentials charged by Defendants for their dealer function in corporate bonds presumably suffices to cover the costs incurred by Defendants and to realize an adequate profit.

213. The existence and persistence of significantly wider spreads for odd-lot corporate bond trades than for round lot trades (as demonstrated in the research summarized above) is itself evidence that Defendants are acting against their unilateral interest by failing to compete on pricing for odd-lot trades. The magnitude of adverse pricing for odd-lot trades cannot be the result of legitimate, individual economic decisions given that round lot trade prices for the same bonds are substantially lower – yet still profitable. In a competitive market untainted by collusive conduct, any individual Defendant could easily narrow its odd-lot spreads toward greater parity with its round lot spreads while making a profit, and thereby capture a greater percentage of the total market in odd-lot trading at still profitable round lot spreads.

214. Indeed, FINRA Rule 5310 would assist Defendants in seizing greater odd-lot market share if they provided more competitive odd-lot spreads. Under Rule 5310, FINRA members (such as wealth management advisors representing retail investors in bond transactions)

⁶⁴ *Id.*

have a duty to “use reasonable diligence to ascertain the best market for the subject security and buy or sell in such market so that the resultant price to the customer is as favorable as possible under prevailing market conditions.” Thus, any individual Defendant who offered better pricing for odd-lots would, given the FINRA Rule 5310 best execution requirements, eventually succeed in winning market share from those Defendants who refused to offer more competitive odd-lot pricing.

215. That adverse pricing for odd-lots continues even as FINRA Rule 5310 requires members to seek best pricing for customers suggests that responsibility for higher odd-lot pricing lies not with retail customers or their wealth management advisors (since FINRA Rule 5310 presumably requires customers’ wealth management advisors to seek out best pricing), but rather, is a direct result of Defendants’ conspiracy to suppress competition in odd-lot pricing. This is especially true in the case of RPTs, where Defendants know a better price is available for their customers (represented by the other leg of the RPT that Defendants trade), and yet still provide adverse prices to odd-lot RPTs compared to round lot RPTs.

216. The failure to obtain the best execution price available is a direct result of Defendants’ conspiracy, and it deprives customers of billions of dollars.

4. Absent Collusion, Defendants’ Failure to Support the Development of All-to-All Trading Was Against Their Unilateral Self-Interest

217. Absent a conspiracy, it would have been in the individual self-interest of each Defendant to support and participate on platforms, such as Bond.com and ABS/NYSE, which would offer odd lot all-to-all trading to investors. Those platforms would attract volume from investors who wanted to disintermediate the dealers. By committing to such a platform, any Defendants who moved first would have obtained a competitive advantage and gained market share. Moreover, in the absence of punishment from other Defendants for breaking with the

Defendants' collusive behavior, any Defendant could have taken this opportunity and been assured a reasonable chance of success.

218. As has been shown in other financial markets that evolve to all-to-all trading, such as equities, there is a substantial increase in trading volume. Volume increases due to lower costs brought about by pre-trade price transparency and the ability of the buy-side (the Class) to provide liquidity. Pre-trade price transparency fosters competition not only by dealers, but also by the buy-side who are now also providing liquidity. Increased liquidity further reduces risk and compresses spreads. In the end, those who move first have the opportunity to not only capture market share but capture market share in a rapidly expanding market. This increase volume offsets reduction in per trade profit. And this dynamic also means that, absent Defendants' collusive behavior, participation of all or most of the Defendants on a platform that increased pre-trade pricing transparency and pricing competition for odd-lots trades was unnecessary for the success of such an platform. Rather participation of only one or two of the Defendants would have been sufficient.

219. Evolution to all-to-all trading would have been the natural progression for odd-lot trades. The progression would have been inevitable, and no single Defendant would have the power to stop it. Absent the conspiracy, it would have been in the self-interest of the Defendants to support the platforms to avoid the risk of being left behind.

B. Common Motive to Conspire

220. Given their collective control of the concentrated Relevant Market, Defendants share a common motive to conspire to charge wider spreads to odd-lot bond investors. By conspiring to do so, Defendants retain their respective controlling shares of the market while still securing supracompetitive profits for each colluding Defendant; these supracompetitive profits compensate Defendants for the lost opportunity to compete individually and secure more of the odd-lot bond business.

C. The Market Is Highly Concentrated

221. As noted above, Defendants control the vast majority of trading, such that the market is highly concentrated. *See, supra*, §I.B. The existence of dealers who might not have been part of the conspiracy does not prevent Defendants' ability to conspire, or serve to constrain the conspiratorial pricing in the sale of odd-lot bonds, because Defendants control the necessary capital to have the largest inventory of bonds, and therefore to compete for the most business. In short, the Defendants control the largest inventory of bonds because they serve as underwriters and issuers of those bonds. That dominance over the supply of U.S. corporate bonds has allowed them to effectively conspire to inflate the spreads of odd-lot bonds in the secondary bond trading market.

222. Nor would a smaller participant in the U.S. corporate bond market who did not participate in the conspiracy wrought by the largest underwriter dealers have the incentive to undercut the inflated prices resulting from the conspiracy. That smaller dealer would also benefit from those inflated prices and would not be able to garner enough capital to support a significant number of trades to justify offering lower, competitive prices in any event.

D. There Are High Levels of Interfirm Communication Between Defendants

223. Defendants' collusion is facilitated by the high levels of interfirm communication between Defendants in the Relevant Market.

224. Defendants installed their senior executives on Tradeweb's Board of Directors. These personnel had weekly conference calls under the cover of Tradeweb's board. In addition to conference calls, the Board met annually in person in Miami, Florida. Defendants used these calls and in-person meetings to coordinate their strategy for controlling the corporate bonds market and preventing the natural progression of odd lots all-to-all trading in furtherance of their conspiracy.

V. DEFENDANTS ARE ALLEGED TO HAVE ENGAGED IN SUBSTANTIALLY SIMILAR CONDUCT IN OTHER TRADING MARKETS TO RESTRAIN THE EVOLUTION FROM OTC TRADING TO ELECTRONIC TRADING, INCLUDING EXCHANGES

225. Defendants' anticompetitive conspiracy to restrict competition on pricing for odd-lots of corporate bonds is not an isolated occurrence. Defendants engaged in multiple, similar anticompetitive conspiracies in other markets for financial instruments during the Class Period that led to government investigations, criminal trials and convictions, billions of dollars in fines, and successful litigation by injured investors. Plaintiffs briefly describe in this and the next section *10* such cases of Defendants' recidivist behavior in terms of antitrust law violations.

226. These findings further support the conspiracy alleged in this complaint because they demonstrate each Defendant's previous willingness to collude in precisely this fashion before and/or collude in other anticompetitive ways in connection with financial instruments. They also demonstrate the Defendants' deficient sales and trading compliance and oversight during the Class Period to prevent this type of conduct. Furthermore, their history of past anticompetitive collusion in the financial markets supports the feasibility and plausibility of the anticompetitive odd-lot conspiracy alleged herein, and Defendants' failure to employ sufficient compliance and oversight systems in their sales and trading businesses to detect such anticompetitive conduct during the Class Period.

A. Credit Default Swaps

227. The conduct in the CDS litigation⁶⁵ was almost identical to the anticompetitive conduct alleged in this complaint, and the CDS litigation involved most of the same defendants as this complaint. The CDS defendants had been enjoying supracompetitive profits from inflated

⁶⁵ *In re Credit Default Swaps Antitrust Litigation*, No. 13-md-2476 (DLC) (S.D.N.Y.).

bid-offer spreads in the market as a result of the inefficiency of the market and their dominance of the CDS OTC market. In the CDS litigation, plaintiffs alleged that the development of electronic exchanges for CDS transactions threatened to introduce price transparency and other efficiencies that would have eliminated CDS defendants' ability to charge artificially inflated bid/ask spreads. In order to protect their market power and to block low-cost exchange trading platforms from entering the market, the CDS defendants allegedly conspired to successfully boycott electronic exchanges and clearinghouses for CDS transactions. The CDS defendants used their influence as the largest customers and members of the boards of IHS Markit and ISDA to pressure both entities to agree not to grant licenses to CMDX, an exchange for trading CDS. CDS defendants' concerted efforts killed the exchange and deterred potential new entrants from setting up exchange trading platforms, and thus, inefficient and expensive transactions persist in the CDS market, to the benefit of CDS defendants and at great expense to investors.

228. The CDS litigation ultimately settled, with the CDS defendants agreeing to collectively pay over \$1.86 billion to plaintiffs harmed by the antitrust conspiracy.

B. Interest Rate Swaps

229. Investors filed an antitrust class action alleging a group boycott conspiracy among major interest rate swaps ("IRS") dealers including Defendants Bank of America, Barclays, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, JPMorgan, Morgan Stanley, and RBS (now NatWest) as well as other banks. The IRS complaint alleged that the IRS market was historically an OTC market and the opaque nature of the OTC market allowed IRS defendants to inflate the bid/ask spreads without buy-side customers having an effective way to obtain competitive quotes on a real-time basis. When the IRS market became increasingly ripe for a shift away from the traditional OTC model in favor of electronic exchange-like execution and clearing, IRS defendants collusively blocked the entry of exchange-like electronic trading platforms that

threatened to disrupt the status quo. Defendants Goldman Sachs, Bank of America, Barclays, Citi, Deutsche Bank, JPMorgan, and Morgan Stanley utilized “strategic investment groups” to coordinate with other defendants to control how the IRS market would evolve so as to protect their supracompetitive profits.

230. Specifically, in 2007, TradeWeb was planning to introduce electronic all-to-all trading to the IRS market. In response to this threat, Defendants Bank of America, Barclays, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, JPMorgan, Morgan Stanley, and RBS joined an initiative they named “Project Fusion” and took control of TradeWeb’s IRS business to prevent it from pursuing all-to-all electronic IRS trading, but without attracting scrutiny. Under the cover of a supposedly lawful and independent enterprise, IRS defendants also used TradeWeb as a forum to hold secret conspiratorial discussions and coordinate their efforts to squash any other threats that arose going forward. The IRS defendants collectively starved and punished the new platforms attempting to offer the buy-side access to an anonymous all-to-all trading until they failed. In addition, the IRS defendants also worked together to systematically deny buy-side customers to inter-dealer swap execution facilities, which they controlled, and used their market power to threaten and retaliate against buy-side entities that attempted to participate in exchange-style IRS execution. As a result of the conspiracy, the IRS market is artificially bifurcated: on one side is an efficient dealer-to-dealer market, which is exclusively for dealers and allows anonymous, competitive exchange-like trading; on the other side is an opaque and inefficient dealer-to-customer OTC market where investors must trade with select dealers and cannot trade with one another – a bifurcation similar to the one between odd-lots and round lots of corporate bonds trading. This conspiracy allowed the IRS defendants to extract billions of dollars in higher trade costs from the IRS investors.

231. The IRS defendants' motion to dismiss was partially denied and the case is pending in the United States District Court for the Southern District of New York.⁶⁶

C. Stock Loan Market

232. Plaintiffs in the stock loan market litigation⁶⁷ allege that defendants conspired to prevent modernization of the stock loan market. While technological progress has improved other financial markets, stock lending remains an opaque OTC market in which there is no central marketplace for stock borrowers and lenders to trade directly with one another or see real-time pricing that could help secure better financial terms. Instead, stock lenders and borrowers must transact through intermediaries, also known as "prime brokers," who take a massive cut of nearly every stock loan transaction. The six investment banks named in the Stock Loan action are the dominant prime brokers in the U.S., including Bank of America, Credit Suisse, Goldman Sachs, JP Morgan, and Morgan Stanley, together with other investment banks.

233. Recognizing the nascent threat posed by all-to-all electronic trading, Stock Loan defendants conspired together to protect their mutual interests. Specifically, in 2001, Defendants Barclays, Goldman Sachs, JPMorgan, and Morgan Stanley, along with a handful of other market participants, formed a company called EquiLend and made it clear to market participants that all new entrants into the market would need to go through EquiLend. Therefore, defendants used EquiLend as a vehicle through which they could protect their privileged role as a broker on every stock loan trade. Stock Loan defendants also used their membership in EquiLend as a pretext to meet and discuss threats they saw to their privileged position in the stock loan market and how to combat them. A major threat they identified was the development of competitive exchange

⁶⁶ *In re: Interest Rate Swaps Antitrust Litigation*, No. 1:16-md-02704 (S.D.N.Y.).

⁶⁷ *Iowa Public Employees' Retirement System v. Merrill Lynch, Pierce, Fenner & Smith, Inc.*, No. 17-Civ-6221 (KPF) (S.D.N.Y.).

platforms like AQS and SL-x for stock lending. In response, Stock Loan defendants starved those start up platforms of liquidity and they used their influences with clearing houses to block these platforms access to central clearing. In addition, Stock Loan defendants also used threats and intimidation to discourage their customers from using these platforms. In order to prevent similar threats from emerging in the future, Stock Loan defendants used EquiLend jointly to purchase the intellectual property underlying those exchanges simply to make sure that no future entrant could offer the same functionality to challenge their stock loan hegemony. Stock Loan defendants collectively, again, via the vehicle of EquiLend, took a controlling ownership stake in AQS in order to ensure that they would control all commercially viable paths to central clearing. As a result of these alleged actions, Stock Loan defendants maintained their monopoly grip as prime broker intermediaries, and, by extension, their ability to charge excessive fees under the cover of price opacity – the precise pattern of conduct engaged in by Defendants in this case in connection with odd-lots of corporate bonds.

234. On September 27, 2018, Judge Failla denied a motion to dismiss the class complaint against defendants in the stock loan market antitrust class action; that case remains pending.⁶⁸

VI. OTHER SECTION 1 VIOLATIONS SHOW DEFENDANTS' CALLOUS INDIFFERENCE TOWARD THE ANTITRUST LAWS

A. LIBOR/Euribor/Yen LIBOR/Swiss Franc LIBOR

235. Government investigations and civil lawsuits have revealed widespread collusion among banks to manipulate benchmark interest rates for multiple currencies (U.S. Dollar LIBOR, Euribor, Yen LIBOR, Swiss franc LIBOR). These investigations have led to fines of upward of \$9 billion and civil settlements over \$500 million for price fixing. Barclays, Bank of America,

⁶⁸ *Id.* at ECF No. 123.

Deutsche Bank, Citigroup, and JPMorgan have all been fined or pleaded guilty. Regulators found that these banks engaged in widespread misconduct, including coordinating false submissions by panelists to the benchmark-setting panel, sharing customer and order information, and manipulating market prices by submitting false orders (*i.e.*, “spoofing”).

B. Foreign Currency Exchange Spot Market

236. Defendants in this complaint have also been accused of fixing bid-offer spreads, coordinating trading strategies with competitors to manipulate benchmark prices, and sharing confidential customer order information and proprietary information on trading positions with competitors in the foreign exchange (“FX”) market.

237. Investigations by financial regulators from around the globe resulted in criminal guilty pleas, settlements, and fines totaling over \$11 billion, as well as the release of orders, notices, and reports detailing exactly how the banks colluded to manipulate the FX market.

238. For instance, the Commodity Futures Trading Commission (“CFTC”) and U.K. Financial Conduct Authority entered orders imposing over \$2.17 billion in fines on JPMorgan, Citigroup, Barclays, and other entities for manipulating the FX market. The Office of the Comptroller of the Currency likewise fined Bank of America, JPMorgan, and Citigroup another \$950 million for manipulation, collusion, and other market-abusive conduct in the FX market. Additionally, on May 20, 2015, the DOJ announced that JPMorgan, Barclays, and Citi (along with other entities) were fined a total of over \$2 billion by the DOJ, and each pleaded guilty to criminal conspiracy charges for manipulating FX prices and the benchmark rates. And the Federal Reserve imposed more than \$1.4 billion in additional fines on Bank of America, JP Morgan, Barclays, Citigroup, Deutsche Bank, and Goldman Sachs (along with other entities) for their “unsafe and unsound practices in the foreign exchange markets,” and the NYDFS fined Barclays, Credit Suisse, Deutsche Bank, and Goldman Sachs (along with other entities) a total of over \$879 million for

conspiring with other banks, including JPMorgan, to manipulate FX prices. In May 2019, the European Commission fined Barclays, Citigroup, and JPMorgan (along with other entities) about \$840 million for taking part in two cartels in the spot FX market.

C. ISDAfix

239. Bank of America, Goldman Sachs, and JPMorgan (along with other entities) have collectively paid over \$222 million to settle private antitrust and common law claims concerning these banks' collusive manipulation of the ISDAfix benchmark. Goldman Sachs paid an additional \$120 million to settle "particularly brazen" manipulation of the ISDAfix benchmark; Barclays and Citigroup, too, have paid large settlement sums to the CFTC for their manipulation of ISDAfix.

240. The Defendants' misconduct related to ISDAfix was undertaken, like that described above, to line their own pockets at the expense of their customers and competition, providing another illustration of a lack of internal controls, horizontal collusion between Defendants that harmed competition and increased prices, and a culture where preserving the bottom line was used to justify serious misdeeds.

D. Mexican Government Bonds

241. The Mexican antitrust regulator, the Comisión Federal de Competencia Económica ("COFECE") announced in April 2017 that it discovered evidence of anticompetitive conduct among dealers in the Mexican Government Bond ("MGB") market, including subsidiaries of Barclays, Citigroup, JPMorgan, Bank of America, and Deutsche Bank. At least one bank was accepted into its cartel leniency program after admitting to participation in a conspiracy to fix Mexican Government Bond prices. After three years of investigation, on October 14, 2019,

COFECE announced that it found evidence of collusion to manipulate MGB prices during a span of 10 years.⁶⁹

E. GSE Bonds

242. In 2018, DOJ opened a criminal investigation into whether some traders manipulated prices in the market for unsecured bonds issued by government sponsored entities (“GSEs”). Deutsche Bank is cooperating with the DOJ in this antitrust investigation.

243. Buy side GSE bonds investors also filed a class action⁷⁰ against 16 banks, including all the Defendants in this litigation as well as other entities, accusing them of conspiring to manipulate the prices of GSE bonds. Defendants’ alleged misconduct in the GSE bonds market involves fixing the “free to trade” (“FTT”) prices of newly issued GSE bonds and artificially inflating the bid-ask spreads. Defendants in the GSE antitrust litigation agreed to pay a combined \$386.5 million to settle the case.

F. Precious Metals

244. In 2015, DOJ, CFTC, Swiss Competition authority, WEKO, and antitrust regulators from the European Union all announced that they opened investigations into possible collusion in the precious metals market by several major banks, including, among others, Barclays, Credit Suisse, Deutsche Bank, Goldman Sachs, and JPMorgan. Several former traders from Deutsche Bank and JPMorgan pleaded guilty to manipulate the prices of gold, silver, platinum and palladium futures contracts. Deutsche Bank, Barclays, and other major dealers also paid a combined 152 million to settle the related civil action.

⁶⁹ Michael O’Boyle, *Mexico’s Big Banks Unrevealed in Bond Market Collusion Probe*, BLOOMBERG (Oct 14, 2019), <https://www.bloomberg.com/news/articles/2019-10-14/mexico-s-big-banks-unveiled-in-bond-market-collusion-probe-leak>.

⁷⁰ *In re GSE Bonds Antitrust Litigation*, No. 1:19-cv-01704-JSR (S.D.N.Y.).

VII. RELEVANT MARKET DEFINITION

245. The relevant product market is the secondary market for United States corporate bonds. Hereinafter, the market will be referred to as “the relevant market.”

246. Most U.S. corporate bonds are traded OTC, and thus every investor must use OTC trading to transact with dealers in order to have access to and trade in U.S. corporate bonds. There are few, if any, substitutes for OTC trading in the secondary market for investors who wish to trade in U.S. corporate bonds.

247. Defendants’ role and dominant market share in OTC trading in the secondary market for U.S. corporate bonds provides Defendants with the power to suppress competition. Defendants’ conspiracy allows them to charge supracompetitive prices on odd-lots versus round lots of the same U.S. corporate bonds in the relevant market.

248. Defendants’ concerted effort to deny an essential facility to an electronic trading platform that sought to provide investors dealing in odd-lot transactions of corporate bonds with greater pre-trade pricing transparency and increased competition on odd-lot pricing was a horizontal conspiracy in restraint of trade to affect, raise, fix, maintain, and stabilize prices in the secondary market for U.S. corporate bonds.

249. Defendants’ group boycott of electronic trading platforms that sought to provide investors dealing in odd-lot transactions of corporate bonds with greater pre-trade pricing transparency and increased competition on odd-lot pricing was a group boycott in restraint of trade to affect, raise, fix, maintain, and stabilize prices in the secondary market for U.S. corporate bonds.

250. The higher costs that result from Defendants’ group boycott raises transaction costs for odd-lot investors in the form of widened spreads. The persistence of the wider bid-offer spread incentivizes Defendants to continue to suppress competition in the secondary market for U.S. corporate bonds.

251. The effect of Defendants' unlawful conduct has been and will continue to be to restrain or eliminate competition among Defendants in regard to the pricing of odd-lots, and will allow Defendants to reap inflated, supracompetitive profits generated by the wider bid-offer spread on odd-lots of U.S. corporate bonds.

252. The geographic scope of the market is the United States.

VIII. IMPACT OF DEFENDANTS' CONDUCT ON THE RELEVANT MARKET AND INVESTORS

253. Publicly available data (including the academic studies discussed above) suggests that Defendants earn supracompetitive fees by maintaining a wider bid-offer spread on odd-lots of corporate bonds as a result of their anticompetitive conduct.

254. Given the total volume of trading during the Class Period (over \$35.2 trillion in par value of corporate bonds traded just between 2013-2017) and the findings of the aforementioned academic studies that odd-lots transaction costs exceeded the costs of round lots by a conservative 10 basis points (if not more), Plaintiffs reasonably believe the potential damages to investors during the relevant time period could amount to billions of dollars of damages caused by Defendants' anticompetitive practices.⁷¹

⁷¹ Plaintiffs believe a total damages value in the billions may even be conservative. From 2013-2018, over \$43.1 trillion in notional value of corporate bonds were traded in the United States. If White (2017) is correct that odd-lot trades represent around 18% of daily market volume (\$7.77 trillion) and Plaintiffs could demonstrate that Defendants' anticompetitive conduct resulted in odd-lots having just a 10 basis point higher transaction cost (again, conservative based on the academic literature) than comparable round lot transactions, that would indicate potential damages of \$7.77 billion during just 2013-2018. That number would still be a conservative estimate, because it would not include the August 1, 2006-December 31, 2012 period or the trading to-date in 2019 (times covered by the Class Period but not reflected in the calculation), nor any trebling of damages, and is based off a conservative 10 basis point estimate of the odd-lot pricing differential (the evidence could support a higher differential).

ANTITRUST INJURY

255. As a result of Defendants' conduct, Plaintiffs and the Class have suffered antitrust injury. Defendants are horizontal competitors who compete to buy and sell odd-lots of corporate bonds to Plaintiffs and the Class. Plaintiffs and the Class are their customers who directly buy from Defendants and sell to Defendants odd-lots of corporate bonds. They both participate in the market for odd-lot bonds. Defendants conspired to restrain the market for odd-lot bonds by preventing all-to-all trading of odd-lots. As a result of the conspiracy, Defendants were able to charge supra-competitive prices. Plaintiffs and the Class directly paid the supra-competitive price to Defendants when buying odd-lots of corporate bonds, or directly received the worse price from Defendants when selling odd-lots of corporate bonds.

FRAUDULENT CONCEALMENT

256. During the Class Period, Defendants actively, fraudulently, and effectively concealed their collusion, as alleged herein, from Plaintiffs and members of the Class. This prevented Plaintiffs from discovering earlier that they were injured by Defendants' conspiracy, despite the exercise of reasonable due diligence.

257. By its very nature, the unlawful activity alleged herein was self-concealing. Defendants conspired to unreasonably restrain the trade of odd-lots of corporate bond in the secondary market and artificially inflated bid/offer spreads to the benefit of Defendants and to the detriment of Plaintiffs and members of the Class. Defendants also conspired to keep their collusive and manipulative conduct secret, including to communicate via channels that are unavailable to the public, because their joint efforts would not have been successful if they had been made public.

258. Defendants' collusion is facilitated by the high levels of interfirm communication between Defendants. The details of these communications were secret, as well as identities of the individuals conducting these communications. The communications among Defendants occur via

telephone calls and in-person meetings. Plaintiffs and the Class have no way to access such communications, rendering impossible any ascertainment of the fact and details of the conspiracy as a whole.

259. None of the facts or information available to Plaintiffs and the Class could have led to the discovery of the conspiracies alleged in this complaint.

260. Defendants also took active steps to conceal evidence of their misconduct from Plaintiffs, the Class, and the public by holding out their activities in the financial markets, including the corporate bond market, as good-faith conduct. Indeed, each Defendant's code of conduct represented that their operations were above-board, providing a false sense of security to corporate bond investors:

(a) **Bank of America.** Bank of America's 2020 Code of Conduct⁷² states that "we are expected to deal fairly with our employees, customers, suppliers, competitors and other third parties" and Bank of America employees should refrain from taking "unfair advantage of any employee, customer, supplier, competitor or other third party through manipulation, concealment, misuse of proprietary and/or confidential information, known misrepresentation of facts or any other unfair business practice."⁷³

(b) **Barclays.** Barclays's Code of Conduct, which is titled "the Barclays Way," states that "we act fairly, ethically and openly and abide by standards which are in many cases higher

⁷² Bank of America's 2020 Code of Conduct applies to employees of "Bank of America Corporation and each of its direct and indirect subsidiaries." Bank of America 2020 Code of Conduct, at 6, <http://investor.bankofamerica.com/static-files/a359ed51-ef9b-4746-be90-bfbc892b3b02>.

⁷³ *Id.* at 10.

than those set by the laws and regulations which apply to our business.”⁷⁴ The code also prohibits anyone working for Barclays from making “any agreements of a formal or informal nature with competitors to fix or set prices or interest rates, restrict the supply of goods or services, conduct bid rigging, marking sharing or any other anticompetitive practice.”⁷⁵

(c) **Citi.** Citi’s Code of Conduct⁷⁶ states that “[w]e are committed to dealing fairly and honestly with our clients, suppliers, distributors, competitors, and employees,”⁷⁷ and people working at Citi must “[n]ot engage in manipulation, concealment, abuse of confidential information, misrepresentation of material facts, or other unfair dealings or practices.”⁷⁸

(d) **Credit Suisse.** Credit Suisse’s Code of Conduct⁷⁹ states that the bank “strive to maintain an exemplary control and compliance culture” and people working at Credit Suisse are responsible for “[l]eading by example, particularly in supervisory roles by setting the right tone for compliance with applicable laws, regulations and policies” and “acting in good faith and with due care at all times.”⁸⁰

⁷⁴ Barclays, *The Barclays Way: How We do Business*, at 6, https://home.barclays/content/dam/home-barclays/documents/citizenship/the-way-we-do-business/The%20Barclays%20Way%202020_Online.pdf.

⁷⁵ *Id.* at 13.

⁷⁶ Citi’s Code of Conduct “has been adopted by the Board of Directors of Citigroup Inc. (“Citi”) and applies to every director, officer, and employee of Citigroup Inc. and its consolidated subsidiaries” Citi Code of Conduct a Citi of Leaders: Enabling Growth and Progress, at 2, https://www.citigroup.com/citi/investor/data/codeconduct_en.pdf.

⁷⁷ *Id.* at 24.

⁷⁸ *Id.*

⁷⁹ Credit Suisse’s Code of Conduct applies to “all members of the Board of Directors and employees of the Credit Suisse Group AG and all of its subsidiaries.” Credit Suisse Code of Conduct, at 3, <https://www.credit-suisse.com/about-us/en/our-company/our-governance/standards-policies/code-of-conduct.html>.

⁸⁰ *Id.* at 14.

(e) **Deutsche Bank.** Deutsche Bank’s Code of Conduct states that “all business conducted by our employees must be driven by legitimate reasons and must be conducted in a manner that avoids or minimizes market disruption.”⁸¹ Deutsche Bank employees “must not engage in activities, practices or conduct that are manipulative, illegal, anticompetitive, or unethical, that exacerbate conflicts between or among our bank and/or its clients, that are contrary to industry standards or applicable regulations, or that are otherwise damaging [Deutsche Bank’s] reputation.”

(f) **Goldman Sachs.** The Goldman Sachs Code of Business Conduct and Ethics states: “Our values demand that we deal fairly with our clients, service providers, suppliers, competitors and each other. No one at the firm may seek competitive advantage through illegal or unethical business practices. Taking advantage of anyone through manipulation, concealment, abuse of privileged information, misrepresentation of material facts, or any unfair dealing practice is a violation of this Code.”⁸²

(g) **JPMorgan.** JPMorgan’s Code of Conduct⁸³ requires people working for the bank to “[a]lways deal fairly and in good faith with [its] customers, suppliers, competitors, business partners, regulators and other employees” and “[n]ever take unfair advantage of anyone through

⁸¹ Deutsche Bank Group Code of Conduct, at 14, https://www.db.com/ir/en/download/Code_of_Business_Conduct_and_Ethics_for_Deutsche_Bank_Group.pdf.

⁸² Goldman Sachs Code of Business Conduct and Ethics, at 3, <https://www.goldmansachs.com/investor-relations/corporate-governance/corporate-governance-documents/revise-code-of-conduct.pdf>.

⁸³ JPMorgan’s Code of Conduct applies to “employees and directors of JPMorgan Chase & Co. and its direct and indirect subsidiaries.” JPMorgan Code of Conduct 2020, at 2, <https://institute.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/documents/code-of-conduct.pdf>.

manipulation, concealment, abuse of privileged or confidential information, misrepresentation of material facts or any other unfair dealings or practices.”⁸⁴

(h) **Morgan Stanley.** The Morgan Stanley Code of Conduct states that “Morgan Stanley is committed to promoting free, fair and competitive market.”⁸⁵ It also prohibits people working at Morgan Stanley from “agree[ing] with a competitor to fix prices or otherwise distort the market” or “deal[ing] with anyone if the purpose is to impede another party from competing in the market.”⁸⁶

(i) **Natwest.** The Natwest Code of Conduct states that its people “demonstrate high ethical standards and do the right thing”⁸⁷ and they “comply with the legal and regulatory requirements that are critical in a highly regulated industry.”⁸⁸

(j) **Wells Fargo.** Wells Fargo’s Code of Ethics and Business Conduct⁸⁹ claims that the bank gain its competitive advantage “through superior performance rather than through unethical or illegal business practices”⁹⁰ and people at Wells Fargo should always avoid “[e]ntering into anticompetitive agreements with competitors, include price fixing, bid rigging,

⁸⁴ *Id.* at 15.

⁸⁵ Morgan Stanley, 2020 Code of Conduct, at 7, https://www.morganstanley.com/assets/pdfs/Code_of_Conduct_Morgan_Stanley_2020.pdf.

⁸⁶ *Id.* at 7.

⁸⁷ NatWest Group, This Is Our Code, at 9, <file:///C:/Users/klv/Desktop/Odd%20Lots%20SOL/Natwest%20our-code-external.pdf>.

⁸⁸ *Id.* at 10.

⁸⁹ Wells Fargo’s Code of Ethics and Business Conduct “applies to all employees, including officers, as well as directors of Wells Fargo & Company and its subsidiaries, regardless of location or employee classification.” Wells Fargo, Our Code of Ethics and Business Conduct, at 4, <https://www08.wellsfargomedia.com/assets/pdf/about/corporate/code-of-ethics.pdf>.

⁹⁰ *Id.* at 14.

market allocation, and agreements to restrict supply or fix resale prices.”⁹¹ The code also requires its people to refrain from “[b]oycotting certain customers or third-party service providers”⁹² or “[a]busing a position of market dominance.”⁹³

261. As a result of Defendants’ affirmative steps to conceal their misconduct, Plaintiffs and the Class were prevented from learning of the facts needed to commence suit against Defendants for the manipulative and anticompetitive conduct alleged in this complaint.

262. Because of the self-concealing nature of the conspiracy and Defendants’ active steps, including fraudulent concealment of their conspiracy to prevent Plaintiffs and the Class from suing them for the anticompetitive activities alleged in this complaint, Defendants are equitably estopped from asserting that any otherwise applicable limitations period has run.

CLASS ACTION ALLEGATIONS

263. Plaintiffs bring this action on behalf of themselves and as a class action under Rule 23(a), (b)(2) and (b)(3) of the Federal Rules of Civil Procedure on behalf of the following class (the “Class”):

All persons in the United States who, between August 1, 2006 to the present (“Class Period”), bought and/or sold odd-lots (lots of total size below \$1 million) of corporate bonds in the secondary market directly from or to a Defendant. Specifically excluded from the Class are Defendants; the officers, directors, or employees of any Defendant; any entity in which any Defendant has a controlling interest; any affiliate, legal representative, heir, or assign of any Defendant and any person acting on their behalf.

Also excluded from the Class are any judicial officer presiding over this action and the members of his/her immediate family and judicial staff, and any juror assigned to this action.

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.*

264. The Class is readily ascertainable and the records for the Class should exist, including, specifically, Defendants' own records and transaction data.

265. Due to the nature of the trade and commerce involved, Plaintiffs believe that there are thousands of geographically dispersed Class members in the Class, the exact number and their identities being known to Defendants.

266. Plaintiffs' claims are typical of the claims of the members of the Class. Plaintiffs and members of the Class sustained damages arising out of Defendants' common course of conduct in violation of the laws alleged herein. The damages and injuries of each member of the Class were directly caused by Defendants' wrongful conduct.

267. There are questions of law and fact common to the Class, including, but not limited to, the following:

(a) whether investors traded in odd-lots of U.S. corporate bonds during the Class Period;

(b) whether Defendants conspired to restrain platforms that would have provided pre-trading pricing transparency and pricing competition for odd lot trades of corporate bonds;

(c) whether investors trading in odd-lots of U.S. corporate bonds were charged higher transaction costs via a wider bid-offer spread than the transaction costs charged to investors trading in round lots of those same bonds; and

(d) the appropriate Class-wide measures of damages.

268. Plaintiffs will fairly and adequately protect the interests of the members of the Class. Plaintiffs' interests are aligned with, and not antagonistic to, those of the other members of the Class, and Plaintiffs have retained counsel competent and experienced in the prosecution of class actions and financial institution-related litigation to represent themselves and the Class.

269. Questions of law or fact that are common to the members of the Class predominate over any questions affecting only individual members of the Class.

270. A class action is superior to other available methods for the fair and efficient adjudication of this controversy. The prosecution of separate actions by individual members of the Class would impose heavy burdens on the courts and Defendants and would create a risk of inconsistent or varying adjudications of the questions of law and fact common to the Class. A class action, on the other hand, would achieve substantial economies of time, effort, and expense and would assure uniformity of decision as to persons similarly situated without sacrificing procedural fairness or bringing about other undesirable results. Absent a class action, it would not be feasible for the vast majority of the Class members to seek redress for the violations of law alleged herein.

CLAIM FOR RELIEF

Violation of §1 of the Sherman Act, 15 U.S.C. §1

271. Plaintiffs repeat and incorporate by reference each of the foregoing allegations of this complaint.

272. The relevant market defined above is a valid antitrust market.

273. Defendants are competitors in the relevant market.

274. Plaintiffs and the proposed Class allege a contract, combination, or conspiracy exists between or among Defendants and/or others that unreasonably restrains and/or eliminates trade, so as to cause artificially high prices for trading in odd-lots of corporate bonds and prevent competition in that pricing.

275. Defendants are engaged in commerce in the United States, and the anticompetitive conduct alleged herein involves U.S. corporate bonds that are in the flow of interstate commerce. Defendants' anticompetitive conduct has substantially impacted and will continue to substantially

impact interstate commerce, because U.S. corporate bonds are traded by investors throughout the United States.

276. As alleged above, Defendants have conspired and agreed with each other to engage in a group boycott as alleged above of certain odd-lot focused electronic trading platforms (including, but not limited to, ABS/NYSE Bonds and Bonds.com's BondStation/BondsPRO platforms) that sought to increase pre-trade pricing transparency, allow all-to-all direct trading and/or anonymous trading, and/or otherwise promote pricing competition for odd-lot investors.

277. Also as alleged above, Defendants have also used their market power as oligopsony subscribers to Bloomberg's terminal service and their role as providers of liquidity and order flow to Bloomberg's electronic corporate bond trading platform in anticompetitive ways in violation of Section 1 of the Sherman Act, 15 U.S.C. §1. Specifically, Defendants forced Bloomberg to deny and/or delay access to Bloomberg's TOMS – an essential facility necessary to participate in electronic trading of corporate bonds to platforms such as NYSE Bonds that sought to increase pre-trade pricing transparency, allow all-to-all direct trading and/or anonymous trading, and/or otherwise promote pricing competition for odd-lot investors.

278. By engaging in this group boycott and forcing a refusal to deal by Bloomberg in connection with an essential facility, Defendants were able to further their goal of securing supracompetitive pricing to the detriment of odd-lot investors versus the competitive pricing provided to round lot investors in the same underlying bonds.

279. This group boycott and refusal to deal agreement between Defendants constitutes a contract, combination, or conspiracy in unreasonable restraint of trade in violation of Section 1 of the Sherman Act, 15 U.S.C. §1, the purpose of which is to unreasonably restrain trade and suppress

price competition in the relevant market and reap supracompetitive prices on the odd-lot transactions in which Plaintiffs and the Class members traded.

280. Plaintiffs and the Class members request the Court to enter judgment in their favor against Defendants, jointly and severally, awarding all damages, in an amount to be proven at trial, costs, and such other relief as the Court deems appropriate and just.

REQUEST FOR RELIEF

WHEREFORE, Plaintiffs and the Class members request the Court to enter judgment in their favor against Defendants, awarding all such relief as the Court deems appropriate and just.

Plaintiffs request the following relief:

A. That the Court determine that this action may be maintained as a class action under Rule 23(a), (b)(1), (b)(2), and (b)(3) of the Federal Rules of Civil Procedure, and direct that notice of this action, as provided by Rule 23(c)(2) of the Federal Rules of Civil Procedure, be given to Class members;

B. That the Court enter an order declaring that Defendants' actions, as alleged herein, violate the law;

C. That the Court award Plaintiffs and Class members damages, treble damages, punitive damages, and/or restitution in an amount to be determined at trial;

D. That the Court permanently enjoin Defendants, their affiliates, successors, transferees, assignees, and other officers, directors, agents, and employees thereof from continuing, maintaining, or renewing the conduct, contract, conspiracy, or combination alleged herein, or from entering into any other contract, conspiracy, or combination having a similar purpose or effect, and from adopting or following any practice, plan, program, or device having a similar purpose or effect;

E. That the Court award Plaintiffs and Class members pre- and post-judgment interest;

F. That the Court award Plaintiffs and Class members their costs of suit, including reasonable attorneys' fees and expenses; and

G. That the Court award any and all such other relief as the Court may deem proper.

JURY TRIAL DEMAND

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, Plaintiffs demand a jury trial of all issues so triable.

Dated: September 3, 2024

/s/ Christopher M. Burke

Christopher M. Burke

Yifan (Kate) Lv

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CERTIFICATE OF SERVICE

I hereby certify that on September 3, 2024, I caused the foregoing to be electronically filed with the Clerk of the Court using the CM/ECF system, which will send notification of such filing to the email addresses denoted on the Electronic Mail Notice List.

s/ Christopher M. Burke

Christopher M. Burke